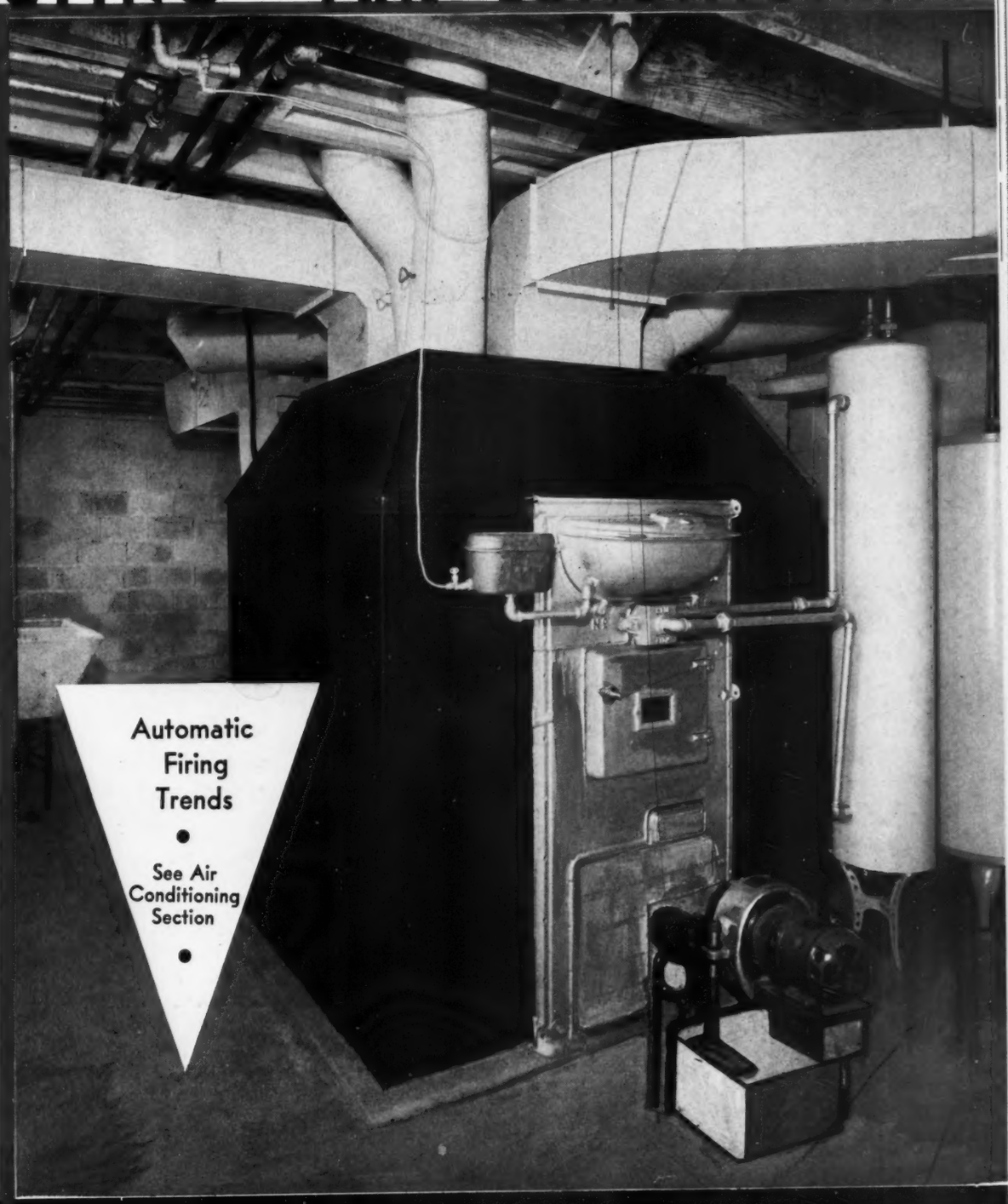
AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING



Automatic Firing Trends

•

See Air Conditioning Section

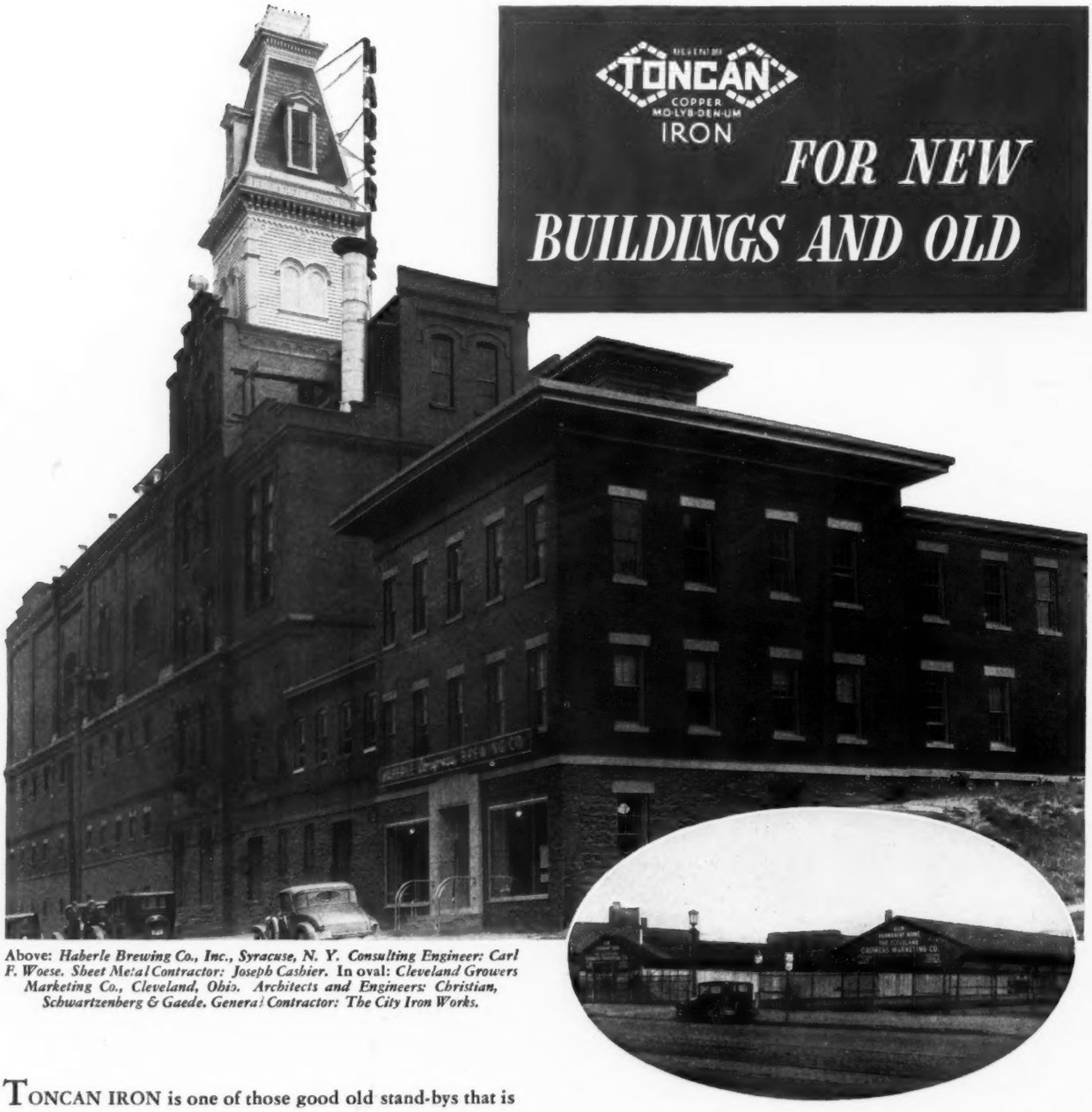
•

ESTABLISHED 1880

APRIL 1934

TONCAN
COPPER
MO-LYB-DEN-UM
IRON

FOR NEW BUILDINGS AND OLD



Above: *Haberle Brewing Co., Inc., Syracuse, N. Y. Consulting Engineer: Carl F. Woese. Sheet Metal Contractor: Joseph Cashier.* In oval: *Cleveland Growers Marketing Co., Cleveland, Ohio. Architects and Engineers: Christian, Schwartzenberg & Gaede. General Contractor: The City Iron Works.*

TONCAN IRON is one of those good old stand-bys that is generally taken for granted. It performs its duty twenty-four hours a day, year after year, often under adverse conditions, and delivers more service per dollar invested than does any other ferrous metal except the stainless alloys.

These facts apply on new construction and in modernization of old structures. Seven tons of Toncan Iron Sheets cover the new Cleveland Growers Market. In spite of the fact that railroad and factory smoke and the elements will beat upon them continuously, the architects and engineers knew from experience that Toncan Iron would meet these heavy service requirements and, therefore, specified it.

When the plant of the Haberle Brewing Co., Inc. sensed the new activity that repeal would bring, they renovized their plant. Toncan Iron was used for all tower window casings and trim, hips and cornice work, flashings, downspouts, gutters, ventilators and ducts.

Every installation of Toncan Iron is a tribute to this modern alloy of refined iron, copper and molybdenum—the alloy that has proved its ability to resist corrosion to a higher degree and to last longer. Write today for a copy of "The Path to Permanence."

ENDURO®

• REPUBLIC'S PERFECTED STAINLESS AND HEAT-RESISTING ALLOYS ARE AVAILABLE IN ALL COMMERCIAL FORMS

REPUBLIC STEEL CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

Hold-Heet Equipment Makes Good Everywhere

Stack Control is the thing!

Hold-Heet—"The Greatest Improvement"

W. ARTHUR RUMMEL, Weir Furnace Distributor, SOUTH BEND, and MISHAWAKA, IND., Jan. 6, 1934: "I have installed one of these controls, and it surely is the greatest improvement in automatic coal controls in recent years. It has held the heat in the house where installed as evenly as if oil or gas were being burned. This is something I have never found before, and I have installed a great many controls. After the thermostat calls for heat, I notice that the stack limit control will close the draft three or four times until the thermostat is satisfied. *Signed—W. A. Rummel.*

Listed by Large Furnace Manufacturer

ROUND OAK FURNACE COMPANY, DOWAGIAC, MICH., Mar. 6, 1934: "In setting up our accessories list for furnaces, we are going to include a Russell Hold-Heet Control. Your reference to Mr. W. Arthur Rummel of South Bend was interesting. We are all fairly well acquainted with Mr. Rummel and know that he must be 100% satisfied in order to give you a recommendation such as he has." *Signed—E. S. Burch, Chief Engineer.*

Especially Pleased with Stack Control

W. A. MAC KENDER, NIAGARA FALLS, N. Y., Feb. 27, 1934: "I am well pleased with this heat control, especially with that part which controls the stack." *Signed—W. A. Mac Kender.*

Stack Control Stands Unlimited Abuse

MURTON J. RODMAN, Heating and Ventilating, BUFFALO, N. Y., Jan. 31, 1934: "You may be interested in an experience we have had with one of your 'HOLD-HEET' regulators. It was found that a furnace needed cleaning after one of your PU15P regulators had been installed with a stack switch in the smoke pipe. Instead of vacuum cleaning the furnace, the soot in the furnace radiator was ignited with a blow torch. A fierce fire swept through the smoke pipe and up the chimney for about ten minutes. The smoke pipe turned red the full length. The heat in this pipe must have been tremendous—it blistered the galvanizing. Strange to say, the stack switch apparently was unharmed—it's still O. K." *Signed—M. J. Rodman.*

Hold-Heet Quality and Performance Convince a Doubter

DUDLEY B. POLING, Heating and Ventilating Engineer, BOWLING GREEN, KY., Feb. 2, 1934: "Several months ago I installed one of your 'Hold-Heet' controls on a coal furnace and have been observing it very closely since then. I am indeed impressed with its performance and perhaps I might mention that I was somewhat prejudiced in favor of —— equipment, due to my extensive use of their equipment throughout most of the states." *Signed—Dudley P. Poling.*

Evidence

Voluntarily, without solicitation or encouragement, these letters come. Manufacturers, jobbers, dealers, installers, users—all write enthusiastically of the complete satisfaction they are getting with HOLD-HEET equipment.

Adopts as Standard Equipment

THE LENNOX FURNACE CO., MARSHALLTOWN, IA., Mar. 12, 1934: "It might interest you to know that we are now preparing price sheets on some new low priced forced air heating units that include your PU15P Regulator Sets complete as standard equipment. This means that our sales should be considerably increased this year." *Signed—John W. Norris, Asst. Sales Mgr.*

Sold a Large Number

LENNOX FURNACE CO., INC., SYRACUSE, N. Y., Feb. 21, 1934: "Mr. John W. Norris, of the Marshalltown factory, advises that they sold a large number of these regulators last year and that they had proven very satisfactory." *Signed—C. H. Schechter, Sales Mgr.*

Manufacturer Recommends Hold-Heet System

RUDY FURNACE COMPANY, DOWAGIAC, MICH., *The Rudygram of January*, 1934: "Rudy has extended its service to dealers so that it can now supply the well known, highly efficient, astoundingly low-priced Hold-Heet regulators for furnace or boiler heating systems.

" 'We believe,' says Leo Biek, assistant Rudy Sales Manager, 'that Hold-Heet regulators represent one of the best values in regulator equipment today. We have arranged to carry an adequate stock of Hold-Heet equipment.' "

"Can truthfully say it is the best of its kind on the market." *Signed—E. O. Shank, Indianapolis.*

Jobber Enthused Over Sales Possibilities

"We took on your product when the heating season was well advanced, and it went over like a house on fire as long as the season lasted." *Signed—S. Margolies, Wender & Margolies, Brooklyn.*

"He said I could tell the company that it did all they claimed for it and that it was a fuel saver." *Signed—F. L. Sanders, A. A. Sanders & Son, Silver Creek, Neb.*

Campaigning on Hold-Heet System

"Up to date, we have sold five and have other prospects to call on. Will put on a direct mail and circular campaign." *Signed—C. M. Pollard, Honsinger & Pollard, Jackson Mich.*

"We have installed five of these regulators. No doubt we will order more of them within the next few days." *Signed—J. R. MacKinnon, National Equipment Company, Pittsburgh, Pa.*

"We have installed the controls and are very much pleased with the operation of them, also the accuracy of the calibrations." *Signed—R. B. Hoyle, Hoyle & Scott, Cambridge, O.*

Uses Hold-Heet Exclusively

"We have installed a number and intend to use them exclusively from now on." *Signed—Jack A. Jebens, Jebens Hardware, Blue Island, Ill.*

"The controls which we have sold here in our city and in our territory are all working very satisfactorily." *Signed—Herbert Johnson, Irving D. Booth, Inc., Elmira, N. Y.*

"Hold-Heet Systems installed in this territory have proved to be entirely satisfactory." *Signed—Ingvald Iversen, Ingvald Iversen, Muskegon Heights, Mich.*

Read these Letters on the Hold-Heet Air Conditioner

More Compliments—Less Service Expense

MURTON J. RODMAN, Heating and Ventilating, BUFFALO, N. Y., Jan. 31, 1934: "We had an interesting experience with one of your ACA1 'Hold-Heet' Winter Air Conditioners. We switched on the 22-inch Noiseless Pressure Fan without notifying the tenants. Someone screamed, and we found that their baby girl had been standing in front of a heretofore dormant register from which a gust of hot air and plenty of accumulated pipe dust swept around her to her alarm and her parents' amazement. It was not necessary to check the other registers. We could feel the warm air as we passed them. And there was no audible fan noise in any of the rooms, even at the return air. This customer discounted our bill, which should be evidence of satisfaction.

Although your equipment is priced low, it is far from cheap. We have had more compliments and less service expense than with apparatus we have installed at twice the cost." *Signed—M. J. Rodman.*

Winter Air Conditioner Makes Good

MOHR-JONES HARDWARE CO., Wholesale and Retail, RACINE, WIS., Jan. 4, 1934: "We installed the air conditioner and are pleased to advise that it has been working perfectly during the cold spell just past." *Signed—W. J. Robertson.*

Air Filters Make Good for Big User

GREEN FOUNDRY & FURNACE WORKS, Green Colonial Furnaces, DES MOINES, IA., Feb. 26, 1934: "The attached order is for immediate shipment. Those filters that we have been testing are showing up very satisfactorily." *Signed—F. R. Green.*

Boosters and Blowers

"Has It All Over" $100.00 Equipment

CHARLES E. TINNEY, ELMIRA, N. Y., Mar. 17, 1934: "Have installed four draft controls and one draft booster, and all are giving good results. I have several prospects for fans and draft controls. I installed one yesterday. A neighbor was watching me, and he said, 'I have one I gave $100.00 for and I think this has it all over the one I have.' " *Signed—Charles E. Tinney.*

Fuel Blower Makes Good—Reorders

THE ELECTRONIC COMPANY, MANKATO, MINN., Mar. 12, 1934: "You recently shipped us a 10-inch fuel blower. We installed this blower and the same customer wants another blower because it works so nicely." *Signed—Louis A. Wilkinson.*

Get on the HOLD-HEET Bandwagon

Write for data on

HOLD-HEET SYSTEM (Regulator)
WINTER AIR CONDITIONER
FUEL BLOWERS and DRAFT BOOSTERS
COMPLETE AUTOMATIC HUMIDITY APPARATUS

See this remarkable equipment at your jobbers.

RUSSELL ELECTRIC CO. *Mfrs.* 342 West Huron Street CHICAGO, U. S. A.

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Ventilating
Roofing

AMERICAN ARTISAN

With which is merged

FURNACES and SHEET METALS AND Warm-Air Heating

Vol. 103, No. 4 April, 1934 Founded 1880

NRA MEMBER U.S. WE DO OUR PART

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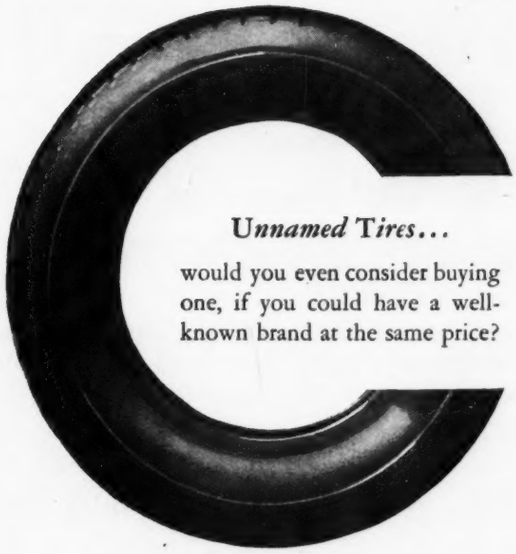
More than 7,000 copies of this issue are being distributed.



Unnamed Tires...

would you even consider buying one, if you could have a well-known brand at the same price?

KNOWN NAMES *make sales*

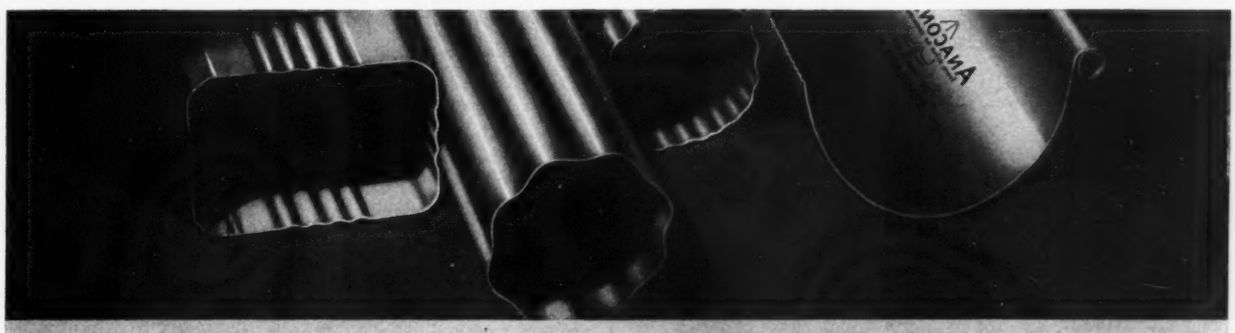
use ANACONDA Copper for this reason

Generally speaking, the product marked with a well and favorably known name is easier to sell. And that applies to Copper just as much as it does to any other product.

Your selling job is easier when you push trademarked Anaconda Copper... backed by the industry's most widely known name and generally accepted by the public as the standard of sheet metal quality.

Then, too, you build a reputation for quality and dependability at the same time, for the public has learned to a great extent that lasting sheet metal work of Copper is the most economical in the long run.

Sheet metal supply houses everywhere carry Anaconda Copper in sheets and rolls, and Copper gutters, leaders, elbows, and shoes trademarked ANACONDA. Remember, *known names* make sales.



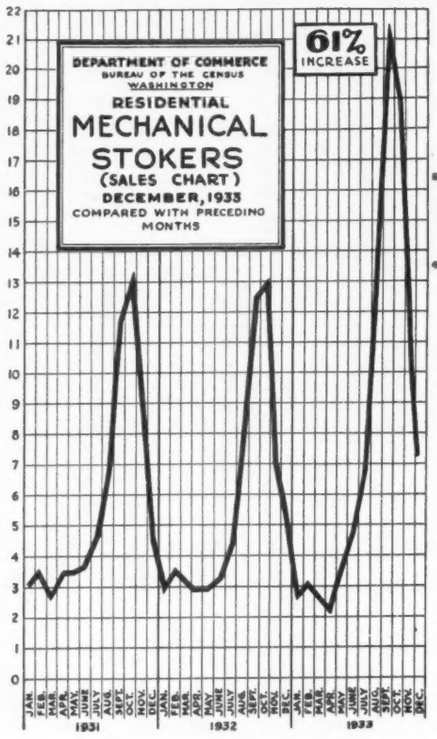
THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut

ANACONDA COPPER

Can You Qualify for a Real Money-Making Proposition selling the

KOLSTOKER



The furnace dealer is a logical distributor for automatic heating equipment. Starting now, you can easily build up a most profitable business with the KOLSTOKER in the big selling months ahead.

TREMENDOUS DEMAND—RAPIDLY GROWING BUSINESS

If you have any doubt as to the rapid growth of this new business and the constantly increasing demand for the mechanical stoker in the home, just study this chart recently issued by the United States Department of Commerce. During the depression years of 1931 and 1932, the general range of sales and the peak months of August, September and October maintained an even level, instead of going down as might have been expected. In September, 1933, with the beginning of recovery, sales increased over 61% above the two previous years—a significant indication of the tremendous demand bound to come with further recovery and more normal times.

There is certain to be an increased demand for all automatic heating devices, but it's equally certain the greatest demand will be for a stoker that burns low-priced coal. Men like coal because it's a natural fuel—economical—and safe. They know it, understand it, and trust it.

The Anchor KOLSTOKER feeds the fuel up through the fire from below, because combustion engineers agree that coal burns most efficiently in that way. As the coal is fed to the fire, the heat first releases the combustible gases. Properly mixed with air, these gases are completely burned and the heat they contain is utilized with complete elimination of smoke and soot. There is a complete combustion of the coal, with a maximum delivery of clean economical heat.

The Anchor KOLSTOKER is a quality product. Economical line production and 69 years of knowing how make possible an exceedingly moderate selling price. The combination presents a tremendous selling opportunity to the furnace dealer who senses the potential market for automatic heating equipment.

A Real Money-Making Opportunity in Meeting the Big Demand

Cost has been a big consideration during recent years but, in the Anchor KOLSTOKER, we offer a practical, efficient and economical coal stoker at a price that most men will feel they can afford to pay. The KOLSTOKER is made by a company with 69 years of experience in the production of heating equipment—manufactured under line production methods to make possible a minimum selling price. It's simple in operation, easy to adjust and control, clean and satisfying. It's an ideal combination of a popular-priced equipment, using the cheapest grades of coal. The Anchor KOLSTOKER meets the big demand, with ten times as many chances to sell as a high-priced equipment burning more expensive fuels.

Distributors, Dealers and Salesmen

We want salesmen who can sell distributors, dealers and consumers. We want good live distributors, who can sell consumers both direct and through dealers, to whom inquiries and dealers can be referred. It's a real money-making proposition for salesmen, dealers or distributors who can qualify. Now is the time to start because the big selling months are just ahead.

KOLSTOKER

10 Years Ahead of the Field

Only KOLSTOKER Offers All these Advantages

1. In engineering features, the KOLSTOKER is ten years ahead of the field—a fact that reflects itself definitely both in efficiency and cost.
2. A product of manufacturing experience. Our company has been building satisfactory heating equipment for 69 years.
3. Low selling price made possible by volume production on line, and these 69 years of knowing how. Designed for a volume market, the KOLSTOKER is priced to sell.
4. Economical in first cost and economical in operation. Burns low-priced coal, with complete combustion and an efficiency that delivers a maximum heat from fuel used.
5. Convenient and labor-saving. The KOLSTOKER eliminates the responsibility and drudgery of furnace-tending, delivering coal to fire as needed, under automatic thermostatic control.
6. Attractive appearance. Most advanced stoker design. Made in completely enclosed cabinet, suggestive of a fine piece of furniture.
7. Clean heat, eliminating smoke, dust, dirt and ashes in basement. Saves furniture, rugs and draperies from frequent cleaning. Makes possible a serviceable and attractive basement.
8. Drive unit employs the powerful hydraulic principle. Quiet—self-contained—self-lubricated—ball-bearing—no gears—no shearing pins.
9. Small fractional horse-power motor is rubber-cushion-mounted—no noise, no vibration. Will not affect radio.
10. Quiet, high-pressure, multi-vane fan and fan-housing completely enclosed in cabinet.
11. All bearings and moving parts operate in an enclosed bath of oil.
12. Coal feed control 100% flexible—adjustable from zero to full feed by simple turn of a dial. An actual finger-tip control.
13. Sectional tuyeres, extra heavy, air-cooled, retort and throat extra heavy cast-iron—for high temperatures, Hopper one-piece copper alloy welded steel, extra heavy, air-tight.
14. Room thermostat, limit control, hold-fire control and relay automatically control KOLSTOKER operation.
15. The Anchor KOLSTOKER is much easier to sell than to sell against. Its cabinet design attracts—its economy and performance appeal—its reasonable price closes the sale.
16. With big profits to distributor and dealer, and being the kind of a stoker the public wants, the Anchor KOLSTOKER is the kind of a stoker you will want to sell.

The KOLSTOKER is made in nine stock sizes, suitable for all heating and power plants from homes to 100 h.p. boiler plants. Also built to order for larger boiler plants. Designed for homes, churches, greenhouses, hotels, apartments, schools, laundries, dry-cleaning plants, factories, store-buildings, etc.

The KOLSTOKER can be sold and installed for cash or under a modern and reasonable deferred-payment plan.

The operation of the Anchor KOLSTOKER is extremely simple and absolutely reliable. The hopper holds 450 pounds of low-priced coal. The number of days that it will run without refilling varies, according to number of rooms to be heated, severity of weather, and temperature to be maintained. However, the KOLSTOKER needs absolutely no attention from one fuel-fill to the next. The feed control is regulated by the simple turn of a dial.

The screw conveyor carries the coal from the hopper to the furnace as needed to maintain the temperature desired. The conveyor is operated by a small motor, automatically started or stopped by a thermostat in the living quarters of the house. The same thermostat and motor also automatically control the operation of the fan. Just enough coal is fed and just enough draft developed to maintain evenly the temperature you want. There is no waste of fuel, heat or power.

The Anchor KOLSTOKER can be easily installed with your present furnace or heating plant, whether steam, vapor, warm air or hot water system is used. It's trouble-proof, with nothing to break, no gears and no shearing pins. It offers the clean convenience of automatic heat, evenly and economically maintained, with an inexpensive fuel. Put this efficiency into an attractive enclosed cabinet of advanced design and you have the KOLSTOKER—a stoker that will virtually sell itself to your trade.

Send Coupon—Grasp Opportunity NOW

ANCHOR STOVE AND RANGE CO., INC., New Albany, Indiana A.A.
Please send full information about your proposition on the KOLSTOKER, from the standpoint of ☐ distributor; ☐ dealer; or ☐ salesman.

Name .....

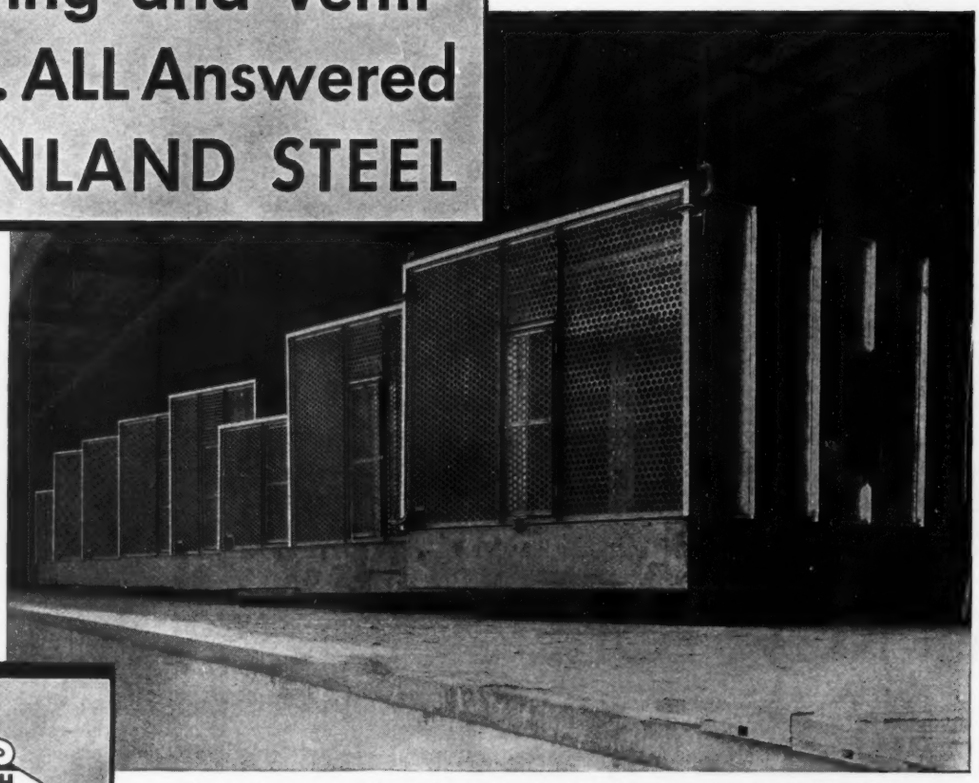
Company Connection, if any .....

Address .....

City ..... State .....

NEW ALBANY – INDIANA – U.S.A.

The Diverse Problems of Heating and Ventilating . . ALL Answered with INLAND STEEL



● *A battery of air washers built of Inland Steel Sheets and Bars by the United States Air Conditioning Corporation, Minneapolis, Minn., for use in the New Post Office, Minneapolis*

INLAND OPEN HEARTH STEEL

THE problems of heating, ventilating and air conditioning equipment manufacturers or contractors are many and diverse. Because of the multiplicity of their problems their choice of a source of supply for steel is more complex. Completeness of line is important, and modern rolling equipment to insure high quality in every required grade of steel is vital. Many of them have chosen Inland.

At Inland they secure the benefits of the most modern equipment. They can secure all of their steel requirements at one source. Where corrosion is severe, Inland Copper-Alloy Steel gives them maximum life per dollar of cost. Where extra severe drawing is required, some Inland Sheet will stand it. And Inland Galvanized Sheets have long been recognized as a superior product.

Investigate Inland's ability to serve you completely—not only in sheets but in any rolled steel product. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago, Illinois.

NRA MEMBER U.S. WE DO OUR PART

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets Strip Tin Plate Plates Structurals Piling

Rails Track Accessories Bars Rivets Billets

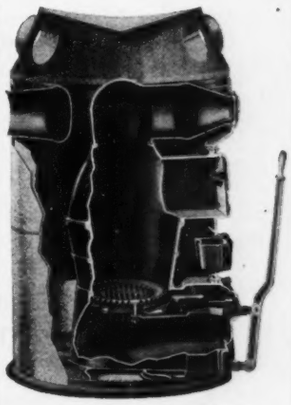
the COMPLETE FURNACE LINE

In the complete line of Sunbeam Furnaces, there is a heating plant of the proper size and type for every warm air heating requirement, which you can install at a price that virtually every home owner can afford to pay.

SUNBEAM CAST IRON FURNACES . . . .

The Sunbeam Cast Furnace is available in 7 different sizes, from 18" to 30". It is made in both the pipe and pipeless types. Machine-molding insures castings of uniform thickness and uniform strength. Doors, feed section and ash pit openings are machine-ground so that they will fit air tight.

All heating parts are heavy and rugged. *Sunbeametal,* the special furnace iron found only in Sunbeam Furnaces, has twice the strength of ordinary cast iron and is one of the reasons why these better heating plants are so durable and long-lived.



Interior View of Sunbeam Cast Iron Furnace

CONSTRUCTION FEATURES

1.—Radiator, smoke collar and cleanout collar are cast in one piece.

2.—Feed Section extends through the front of furnace.

3.—Ash Pit extends through the front of furnace.

4.—Two-Piece Fire Pot is extra heavy; has smooth, steep walls.

5.—Duplex Grate—has outer ring for shaking ashes and center section for dumping clinkers.

6.—One Piece Base assures furnace of firm, level setting and saves installation time.

7.—All vertical joints are eliminated.

SUNBEAM
WARM-AIR FURNACES

SUNBEAM STEEL FURNACE . . . .

This heating plant is a distinct innovation in design and construction. The drum is constructed of ⅛" boiler plate with the head of ¼" boiler plate. All joints are electrically arc-welded to produce a seamless unit from which fumes, gas and soot cannot escape into the circulating air. The Sunbeam Steel Furnace is better for burning oil and better for burning coal.

SUNBEAM GAS FIRED FURNACE (not illustrated) is designed for burning gas exclusively and completes the line of Sunbeam Warm Air Furnaces.

Interior View of Sunbeam Steel Furnace

POINTS OF SUPERIORITY

1.—One Piece Head fits *outside* of Drum approximately 7" below top of heating unit eliminating joint at top of Drum.

2.—Direct Draft Damper in radiator is outside of casing where it will not warp, bind or burn out.

3.—Cast Iron Collar reinforces the steel collars at connection of Drum and Radiator.

4.—Full Height Fire Pot—14½ inches high—assures a long firing period.

5.—Duplex Grate—has outer ring for shaking ashes and center section for dumping clinkers.

6.—Jointless Ash Pit—Ash pit bottom is welded to drum eliminating any joint at this connection.

7.—No Direct Connection between Casing and Drum eliminates possibility of gases or fumes entering warm air chamber.

MORE FURNACE DEALERS SELL SUNBEAM FURNACES AND AIR CONDITIONING UNITS THAN ANY OTHER KIND

THE FOX FURNACE CO.

ELYRIA, OHIO

A Division of

AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

The Fox Furnace Co., Elyria, Ohio

We would like more information about Sunbeam Furnaces. Also give us the name of the Sunbeam Jobber nearest us.

Name.....

Address.....

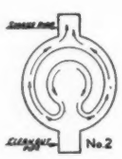
City and State.....

A-4

An Invitation To Dealers who seek larger profits and a faster growing furnace business

PATENTED REVERSIBLE RETURN-FLUE RADIATOR

The Reversible Return-Flue Radiator gives (Drawing No. 1) a long and continuous smoke travel for hard coal, oil or gas. In drawing No. 2 the Radiator is set for soft coal; in No. 3 for dirty coal or poor chimney conditions.



Genuine Fire Box Quality Open Hearth Steel is used throughout and double electric arc welded into practically one continuous piece.

IT costs dealers less to do business when they handle the U. S. Steel Warm Air Furnace. But that's not all!

For the U. S. Steel furnace contains extra value for your customers—PLENTY of extra value that they can readily see for themselves.

This furnace, due to its new and exclusive patented design, delivers 50% more heat with 25% less fuel. In competitive tests it steps out ahead of ordinary furnaces in a truly sensational manner. Moreover, your customer can easily understand why this is,—and should be true. A potent sales factor that puts the odds heavily in your favor.

It costs less to do business when you handle the U. S. Steel furnace. Less capital is needed. Less display and warehouse space is used. This is because of the Reversible Return Flue Radiator with which you can meet any fuel or chimney requirement with the one model. This adaptability to oil burning and other types of automatic heat is a distinct profit—more advantage for the U. S. Dealer.

Progressive dealers who would like to consider joining forces with a progressive manufacturer are invited to write for complete data.

U. S. PRESSED STEEL PRODUCTS CO.
KALAMAZOO, MICHIGAN

VOLUME 103 AMERICAN ARTISAN NUMBER 4

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Code Problems of the Present

Code Progress

Letters from readers commenting on various phases of our Code of Fair Competition seem to indicate that there is considerable uncertainty and some dissention with many of the regulations and accomplishments made to date.

Quite a bit of uncertainty seems to center around the choice of our National Code Authority Committee. Readers have written that they do not believe the geographical distribution of members is all that could be desired and that some of the fields of activity have not been fairly represented.

In delving into these comments we have made it a point to write to persons who ought to know what is going on asking for their opinions. The replies of these individuals (some in Washington; others actively engaged in promoting code work) are all pretty much along the same line.

So far as geographical representation on the National Code Committee is concerned we can take from these replies to our queries that some politics entered into the selection. This should not be taken too seriously for we all know that such a procedure is bound to occur in any effort such as this. Undoubtedly changes will be made later as the industry finds out just how this whole proposition is working out.

Identically the same situation exists in regard to the fair representation of all our various fields of activity. We have taken into our code several fields of work which may later be removed because they do not really fit into our picture. We must also realize that several months must pass before the industry settles down to smooth, efficient functioning under the code.

We have pointed out in several editorials that these national developments are important, surely, but the most important phase of the work will be that which clears through the local and state or state area Code Authority Committees.

There seems to be little doubt but that it will be these local organizations which will make code application effective or just another experiment. Already several association groups have set about organizing and appointing their state and local authorities. This is a move in the right direction. Such authorities should be chosen with extreme care—such men should be honest, fair, aggressive—for upon their integrity and judgment will rest the satisfaction the industry will derive from the code.

There are, too, the highly important individual regulations which mean much to the effectiveness of the code. These have been pointed out editorially before. They are cost accounting, bid presentation, fair trade practices, etc. These regulations, which will be daily problems, contain much ground for future work. Associations can help greatly by showing members how to comply with these regulations.

It is our belief that right at this time—while we are waiting for the code to be signed—that organizing for individual and local operation under the code is much more important than worry over the national picture which seems unlikely to be a very serious or personal problem of the future.

◆

Interesting Developments

In some ways this issue is one of the most interesting published in several months. It indicates, we think, some new developments of importance and value. Perhaps we should not say new, for these developments have been "on the fire" a goodly length of time.

Take oil burning, for example. The application of oil burners to furnaces is not new—it is a development which has been hindered by some structural features of furnace design and by hesitancy on the part of burner companies to install in furnaces. But this situation has been completely changed. There are many furnaces now on the market specifically designed for burning oil. With such equipment any contractor can sell the home owner exceptional automatic heat.

Then consider summer cooling. Some say it is a big future field. Others can't see it that way. The stumbling block for both groups has been cost. But now we can adapt other phases of our work to cooling—attic fan ventilation—and thereby reduce the cooling load.

We feel proud of our test houses. Such investigations mark the first effort of a trade paper to actually help the reader by investigating the contractor's common problems. Our investigations have only begun, but already we have developed some ideas which you will hear all about this summer. Some of these ideas are startlingly new; others only prove some of the industry's ideas right or wrong.

The San Francisco War Memorial

The Veterans' Building and the Opera House stand side by side in San Francisco's new Civic Center. Each building has an enormous copper-covered mansard roof, constituting one of the largest sheet metal contracts ever let on the west coast. Below is a plan of the copper-clad roof of the Veterans' Building showing the huge mansard, skylights, roof structures.

ONE of the largest sheet metal contracts ever completed in San Francisco, if not on the west coast, entailed the application of some 75 tons of lead coated copper and approximately 10 additional tons of uncoated copper as well as 22,000 square feet of skylight and 52 fire doors used on the twin buildings of the San Francisco War Memorial.

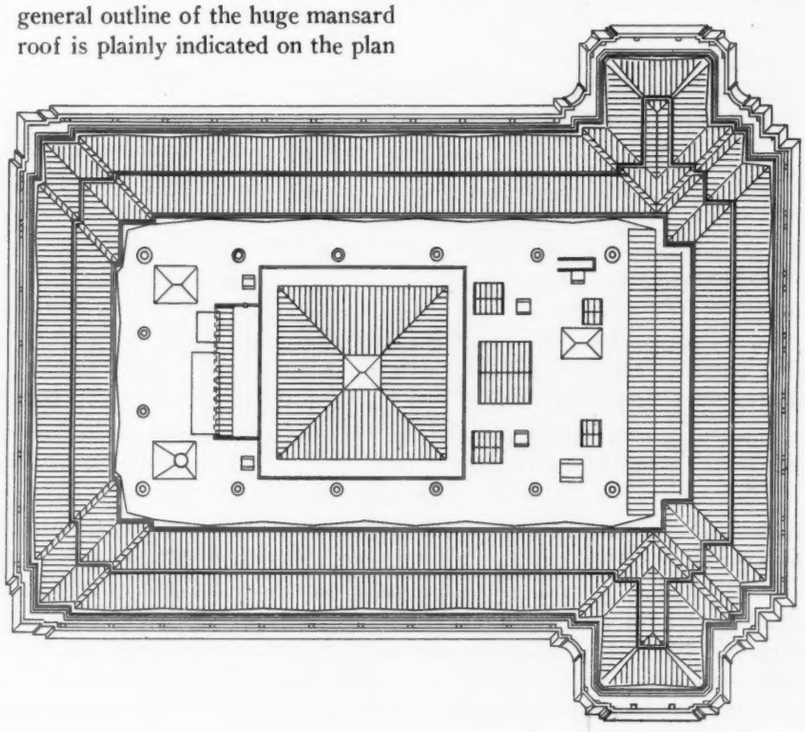
This war memorial consists of twin buildings — the Veterans' Building and the Opera House, separated by a memorial court, both standing in San Francisco's new civic center. The buildings are nearly identical in architecture, each being 180 by 282 feet on the ground and 78 feet high. Each building is topped by a 22-foot mansard roof which traverses all four sides of each building and is copper covered. The Opera House occupies one building and has a seating capacity of 3,285 persons. This building also has offices for the opera company.

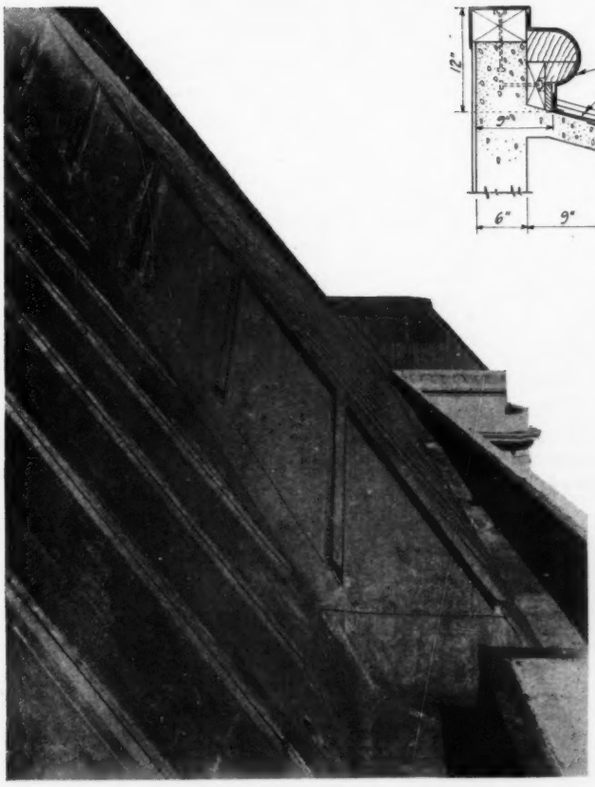
The Veterans' Building has a smaller auditorium, offices, conference rooms, club rooms, library, lounge, and galleries for exhibition purposes. The two buildings cost in excess of six million dollars supplied by public subscription and a city bond issue. The architect is Arthur Brown, Jr., with G. Albert Lansburgh collaborating.

The sheet metal work was done by the Guilfoy Cornice Works, San Francisco, and totaled more than $85,000.

Since both buildings are practically identical in architecture and are identical in the sheet metal application a description of one building serves for both structures. The general outline of the huge mansard roof is plainly indicated on the plan drawing of the roof. This plan drawing is supplemented by the photographs of the building and by closeup pictures showing details of the roof work.

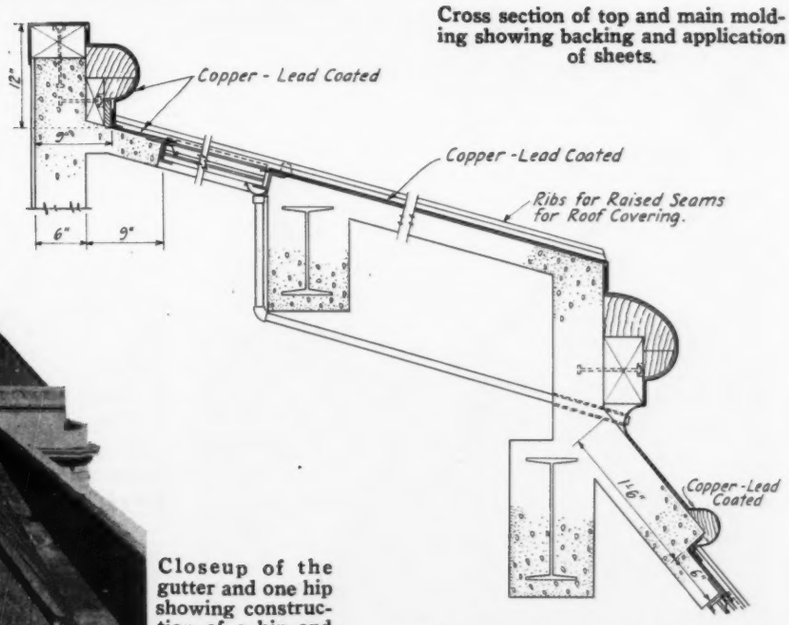
In elevation, the mansard consists of two sections—the lower pitched sharply from the gutter up to a deck molding and the upper continuation rather flat ending at the top in the copper mold and cap over





Closeup of the gutter and one hip showing construction of a hip and several short battens.

Cross section of top and main molding showing backing and application of sheets.



the parapet wall. The roof over which the copper was laid consists of a concrete slab of a fine mix laid with particular pains to get a smooth and level surface.

The copper was laid with batten seams with battens spaced on 24-inch centers. In order to permit placing the sheet metal contractors' battens, redwood sleepers approximately 2½ by 2½ inches were embedded in the concrete slab with the top surface flush with the surface of the concrete. Into these sleepers the sheet metal contractor nailed his battens. The battens used have a reverse taper with vertical bottom to allow for expansion. The method used in cleating the sheets along the battens is identical with the specifications of Standard Practice in Sheet Metal Work and consist of cleats placed at 12-inch intervals and turned into both the cap and the pan sheets.

As shown on the roof plan the bottom of the mansard is a series of wide and narrow gutter sections with drains at about 36-foot intervals. The average length of sheet (taking into account these various gutter widths) was 8 feet. The top, flat section is 14 feet from deck mold to coping base while the lower steeply pitched section is 22 feet from gutter to deck molding, with all dimensions practically identical on all four sides of the mansards on both buildings.

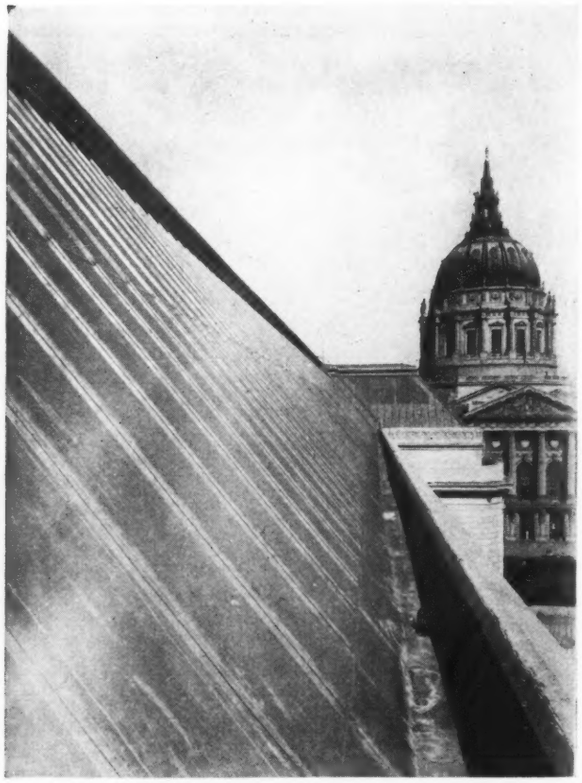
Separate batten caps were used with the same cap carried across skylight sections as the covering for the up and down bars. These skylight sections are placed in both lower and upper sections of the mansard.

The general construction of the skylight section is indicated in the details. This particular skylight, the "Pacific Puttyless" is made by the Guilfoy Company and distributed under their name.

Gutters

The bottom of the mansard ends in a wide and deep gutter which lies behind the masonry parapet of

This striking photograph shows clearly the design and construction of the main molding, typical battens and hips, skylight sections and the two pitched sections of the mansard.

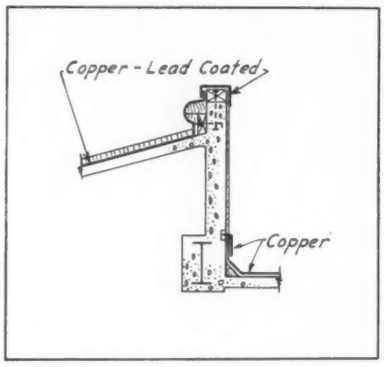


The battens march in endless lines down the mansard. The wide and deep gutter starts from a reglet in the coping, forms the backing for the wall, crosses the gutter bottom and joins the main roof—in two sheets.

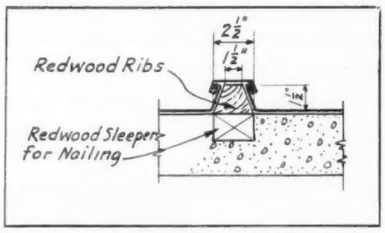
the exterior face walls. The gutter combines a parapet flashing, gutter and back apron varying in width and depth between drains which are all of the inside type.

The parapet cap is one sheet which is caulked into a reglet in the masonry along the top and brought down the back face for several inches. The wall flashing sheet is a separate part of the gutter and forms the back apron, and is fastened into the reglet, then the reglet is caulked with elastic cement. The cross seams were locked and soldered while the flashing sheet was cleated to sleepers.

Practically the same construction was used around the high parapet walls which divide the mansard from the flat deck in the center of the building. A wall cap is brought down the back face for several inches after crossing the top of the wall from its lock with the top sheet of the molding above the batten roof. A reglet in the wall about two feet above the cant block takes the upper edge of the cap flashing while the base flashing is brought out from under the built up roofing, across the cant block and up under the cap sheet.



Cross section of parapet wall behind the mansard showing application of copper sheets.

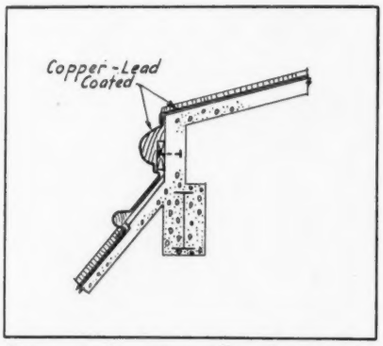


Battens were nailed to sleepers embedded in the concrete of the roof.

Molding

As indicated in the photographs an interesting feature of the mansard is the two heavy deck moldings which divide the upper and lower areas and top the mansard. The general construction of this molding is illustrated in one of the details which shows the wood blocking which was erected for the sheet metal contractor. This molding is practically duplicated in slightly different cross section in the molding around the top of the upper section of the mansard.

Beginning at the top of the parapet the Guilfoy Company laid out the metal application to take a wall cap sheet. From under the cap sheet the metal section for the top molding is carried down over the molding and locked with the sheet above the skylight. From the skylight a roof sheet is carried down to the edge of the upper section and turned down over the mid-point molding. This molding which is really a double section as shown is all in one sheet locked at the bottom to the roof sheet of the lower section. The bottoms of the lower section sheets are slipped over and locked to the gutter sheets.



Cross section of smaller, but corresponding molding, around roof structures

All these parts of the roof are covered with 16-ounce lead coated copper with a lead coating of 15 pounds on each side (30 pounds for two sides) per 100 square feet. Since lead coated copper was used no treatment for patina was employed, but the copper has assumed a uniform dark color under weathering.

Marquise

The Opera House has one of the largest marquise on the west coast—19 feet in projection and 200 feet long. The deck is lead coated copper while the remainder of the unit is plain copper. The marquise is really a copper kalamein job made without cresting or ornamentation.

(*Continued on page* 52)

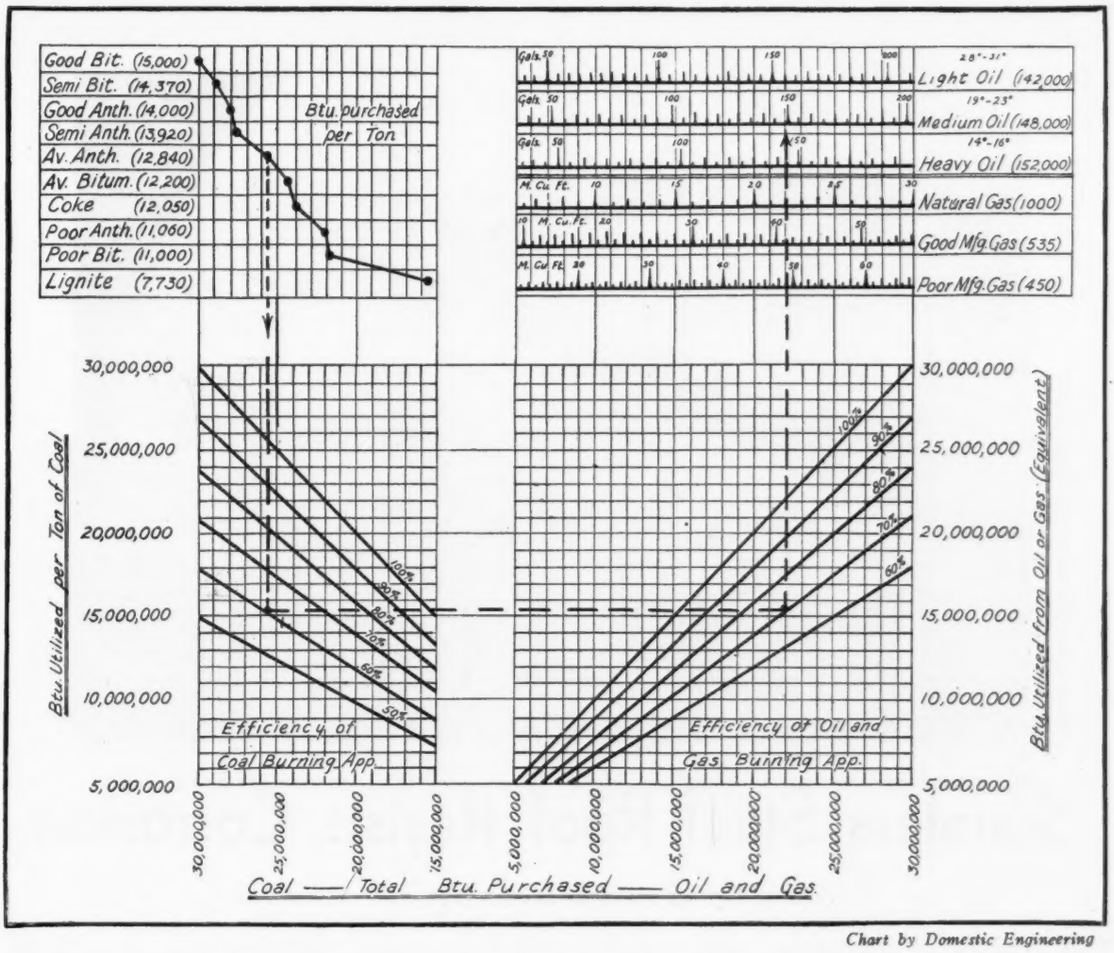


Chart by Domestic Engineering

Chart For Figuring Coal-Oil-Gas Costs

"I BURN —— tons of coal each heating season. What will it cost me to burn oil or gas?"

To use the chart, select from the small chart in the upper left hand corner the type of coal burned for the season cited by the customer. Lay the rule vertically along or between lines of the upper left hand chart and project down until the rule intersects the line of efficiency for the coal burning apparatus. Place a dot at this intersection. Then lay the rule horizontally across the two lower charts and place a dot at the intersection of the rule and the efficiency line for oil or gas burning apparatus. Last lay the rule vertically and project upward until the rule intersects the lines showing the type of oil or gas the owner can use and read the gallons of oil or feet of gas required per ton of coal burned.

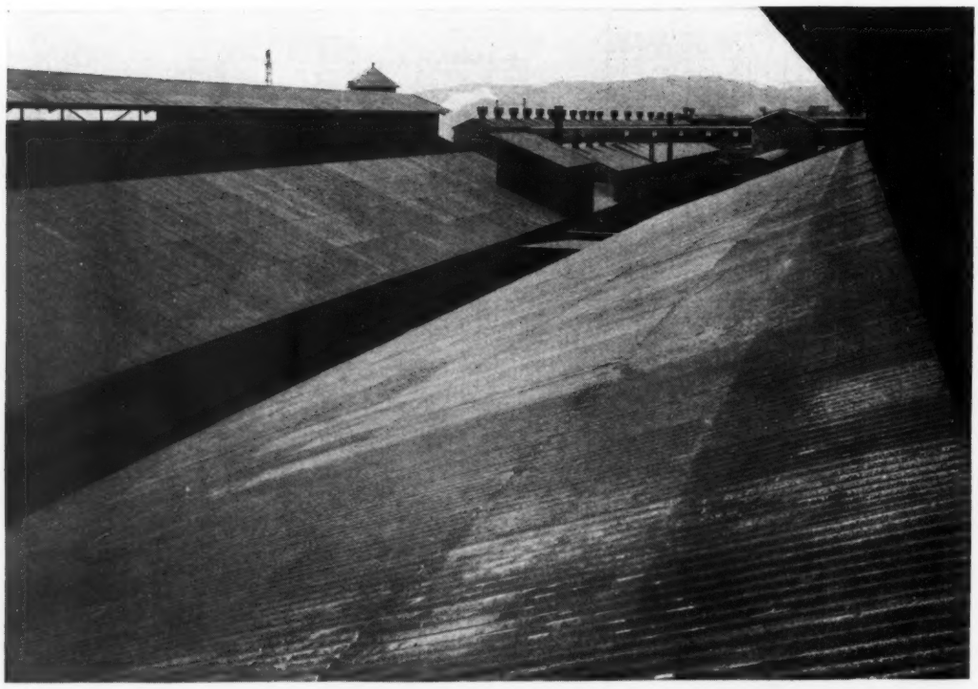
As a last step the cost of oil per gallon or gas per thousand cubic feet is multiplied by the number of tons of coal burned to get the comparative costs.

A typical problem has been plotted on the chart. The owner burned 15 tons of average anthracite coal of a B.t.u. content of 12,840. The rule is laid vertically down from the dot on the coal line as shown and projected down to intersect the efficiency lines for coal burning plants. It should usually be assumed that an average coal burning furnace will be 60 per cent efficient under average firing conditions. (A large furnace in a school, tended by a fireman, might be 65 or 70 per cent efficient.) The rule is then laid horizontally from this point on the 60% efficiency line.

It is safe to assume that an oil or gas burner placed in an original coal burning furnace will be not more than 70 per cent efficient. (A matched oil burner and furnace unit or a gas furnace may be 80 or 85 per cent efficient.) A dot is placed at the intersection of the rule and the 70 per cent gas or oil efficiency line. The rule is then laid vertically upward and crosses the oil and gas volume lines as shown.

To read gas or oil volume, the rule of the problem shows that each ton of coal requires an equivalent of 49,000 cubic feet of poor manufactured gas; 41,250 cubic feet of good manufactured gas; 22,000 cubic feet of 1,000 B.t.u. natural gas; 145 gallons of heavy oil; 149 gallons of medium oil; 155 gallons of light oil.

We then multiply these figures by 15 tons (the amount of coal burned) to get the number of gallons of oil or cubic feet of gas required for an equivalent amount of heat as secured from the coal.



Stainless Steel Roof Resists Corrosion

By H. S. Downing

THE application of special metals to roofs and sides of industrial plants, especially on locations where corrosion is an important factor, is always of interest to sheet metal and roofing contractors.

Plant number 1 of the Pittsburgh Plate Glass Company at Creighton, Penna., has a number of buildings of the mill type housing operations producing corrosive fumes. In addition, the entire region has been known for years as especially destructive to metal roofing because of the foggy, acid-laden atmosphere.

Under the conditions prevailing ordinary sheet metal which is not kept well painted lasts only a few years.

In 1925, eight years ago, some of the buildings were roofed with Allegheny stainless steel sheets. The sheets used are of light gauge, being only eighteen thousandths of an inch in thickness, and corrugated the same as standard roofing sheets. The sheets used were No. 26 gauge with standard corrugation and standard lap. They were applied with Allegheny Alloy clips of the same composition as the roof sheet and no particular care was taken to insulate the alloy sheets and clips from the steel frame work of the roof structures.

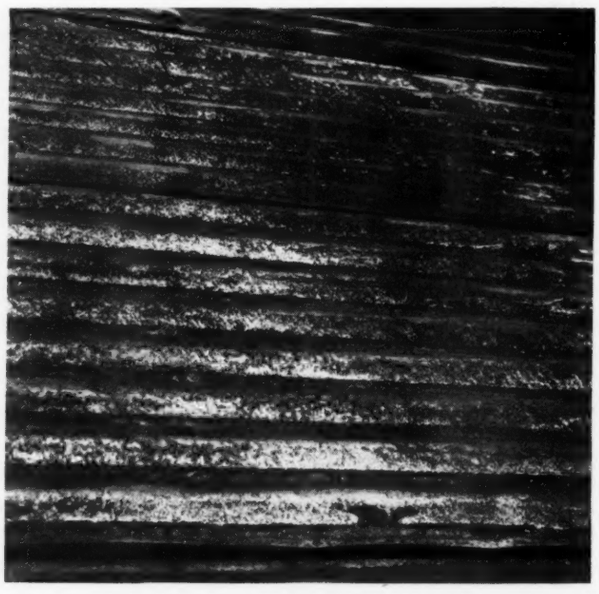
In addition to resistance, these light gauge sheets were selected in order to save weight. By applying light sheets, a saving in the dead load of the roof proper made possible reduction in sizes of the structural steel frame and the roof supports.

After eight years exposure these stainless steel sheets are in as good condition as when they were laid. No paint has ever been applied thereby eliminating this item of maintenance expense.

▲

Above is a view of the roof taken after the sheets had been on eight years and at the right is a close-up photograph showing the condition of the sheets. No paint or maintenance was given the roof or the sheets.

▼



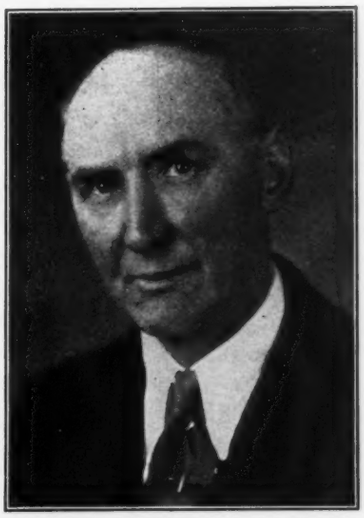
The Michigan Convention

THE Michigan State Association convention was held March 6, 7 and 8 in Grand Rapids with the first day devoted to a meeting of the board of directors.

The principal matter up for discussion at this year's meeting was the National Code for the roofing, sheet metal and warm air heating contractors and the second day of the convention was devoted to discussions of various phases of this National Code. Several suggestions for compliance and a plan to effect a general increase in business were made by Frank Ederle, Secretary of the Michigan Association. A plan has been devised and methods of procedure set up whereby compliance with all provisions of the code can be made on short notice by the state association and its local groups. The association is interested in promoting a general increase in building construction both residential and industrial and plans were announced for participation in a general movement to increase construction. The association went on record as approving the support of manufacturers conforming to the provisions of their individual codes and the condemnation of manufacturers who do not comply with their codes.

Reports from various parts of the state were presented by delegates to the convention as follows:

F. E. Ederle, Secretary, Grand Rapids



John Bos, President, Muskegon

Jackson—business not very active; Kalamazoo—local association increasing its activities and meeting twice a month, business picking up; Grand Rapids—business not much improved; Muskegon—local association becoming increasingly active and some signs of business improvement; Saginaw—general business improving and local association showing increased membership and activity; Flint—local organization contains practically 100 percent of all contractors in the industry and business good; Detroit—business in the automotive industry greatly increased, the association gaining in activity and general expectation of a better year for 1934 looked for.

A. W. Howe, President of J. M. & L. A. Osborn Company, presented important features of the sheet metal distributors' code as the code and its expected results impressed him.

Mr. Howe declared that the NRA is trying to eliminate the critical situation of 5 percent of the population controlling 95 percent of the wealth of the country and declared that one of the things to be looked for in the future is the more even distribution of profit from all types of commercial and manufacturing lines.

Mr. Howe stated that he felt sure one of the intentions of the administration is to educate all kinds of industry and all kinds of business on ways and means of making money and that whether or not indi-

OFFICERS 1934-'35

President—John Bos, Muskegon
Vice-president—Wm. W. Busch, Detroit
Secretary—Frank Ederle
Treasurer—Homer Brundage, Kalamazoo
Directors—
John Erhardt, Grand Rapids
Thomas Marshall, Detroit
Albert Nydam, Grand Rapids
Everett Karer, Flint
Code Authority—
(Nominated—to be elected and to function when, as and if the code is adopted.)
Wm. P. Sullivan, Detroit
John Erhardt, Grand Rapids
Wm. Schweitzer, Flint
Adam Martin, Saginaw
Homer Brundage, Kalamazoo

AUXILIARY OFFICERS 1934-'35

President—Ray Mahoney, Chase Brass & Copper Co.
Vice-President — Jake Jacobs, Ludowici-Celadon Co.
Sec. - Treasurer — Alfred Green, National Lead Co.
Sergeant-at-Arms—Ernie Overbeck, Ludowici-Celadon Co.

H. F. Brundage, Treasurer, Kalamazoo

viduals agree with the provisions of the code it seems as though all business men must live up to the provisions whether they like it or not.

An outline of the general wholesale distributing industry was presented to point out that there are about 169,000 wholesale establishments handling an annual sales volume of about $60,000,000,000. This wide representation and large sales volume can either make or break business, in the estimation of the speaker. Better ethics on the part of the wholesaler and closer cooperation between manufacturer and wholesaler, wholesaler and dealer, will be required in the future.

An explanation of the code controlling the furnace manufacturers was presented by B. M. Allen of the Marshall Furnace Co., in the absence of A. F. Frazee, Rudy Furnace Co., who was in Washington attending a code conference. The explanation of the status of the manufacturers' code and the provisions of the code followed closely the outline and presentation published in the January issue of AMERICAN ARTISAN.

Michigan Plan for Code Cooperation

For the purpose of administering the Code of Fair Competition (if and when signed) for the roofing and sheet metal contracting industry, in the lower peninsula of Michigan, the following arrangement was adopted in convention assembled this eighth day of March, 1934, this instrument to become effective at once in so far as the preliminary steps are concerned and permanently effective if and when the National Code is signed by the President of the United States.

ARTICLE I

DEFINITIONS:

The term "roofing and sheet metal contracting industry" as used herein is defined to mean the business of furnishing, installing, applying and repairing and servicing or maintaining roofs on which sheet metal, slate, tile, asbestos and asphalt shingles, composition or membrane roofing, asbestos or other roll roofing insulation and other special treatment of roof surfaces is required; the furnishing, erecting and applying of sheet metal, slate, tile, asbestos or asphaltic materials used for siding on any building or structure; waterproofing and dampproofing as required on floors, walls and foundations of buildings and nonhabitable structures, except cement waterproofing done by the integral method; the fabricating, furnishing, erecting, installing, applying, repairing, servicing or maintaining of all sheet metal work of No. 10 U. S. gauge and lighter as required on or in buildings and structures, including among others, metal ceilings, warm air furnace heating systems and air conditioning and cooling systems used in connection therewith, sheet metal work in connection with heating, ventilating and air conditioning systems, blow pipe and exhaust systems and sheet metal products and equipment required in industrial plants, and for agricultural and domestic use.

The term "contractor" as used herein shall include any person engaged in any one or more branches of the business as outlined in the first paragraph of Article I, or who offers his services as such.

ARTICLE II

The lower peninsula of Michigan shall be divided into fourteen districts as follows:

No. 1. Counties of Oseda, Lake, Mason, Manistee, Wexford, Grand Traverse, Benzie, Leelanau, Antrim, Otsego, Cheboygan and Emmett. (Arns and Cole, Traverse City, selected.)

No. 2. Presque Isle, Montmorency, Alpena, Oscoda, Alcona, Roscommon, Ogemaw, Iosco, Clare, Gladwin, Arenac, Isabella, Midland, Bay, Gratiot, Saginaw, Tuscola, Huron (Adam Schepper, Bay City, selected.)

No. 3. Samlac and St. Clair. (H. M. Tovar, Port Huron, selected).

No. 4. Lapeer, Genesee and Shiwassee. (E. Karrer, Flint, selected).

No. 5. Ingham, Eaton and Clinton. (F. B. Harrington, Lansing, selected).

No. 6. Ionia, Kent, Montcalm, Mecosta and Newaygo. (C. Worness, Grand Rapids, selected).

No. 7. Ottawa, Muskegon, Oceana. (W. J. Stermart, Muskegon, selected).

No. 8. Van Buren, Berrien and Cass. (R. Sykora, Benton Harbor, selected).

No. 9. St. Joseph, Kalamazoo and Allegan. (H. F. Brundage, Kalamazoo, selected).

No. 10. Branch, Calhoun and Barry. (Chris. Jensen, Battle Creek, selected).

No. 11. Jackson, Hillsdale and Lenawee. (Maurice & Campbell, Jackson, selected).

No. 12. Washtenaw, Martin. (Otto Graff, Pontiac, selected).

No. 13. Livingston and Oakland. (Wm. Busch, Detroit, selected).

No. 14. Monroe and Wayne. (E. H. Schlenker, Ann Arbor, selected).

A temporary chairman for each district shall be appointed at the Convention by the President. Each chairman shall call a meeting of his district within fifteen days, at which time all sheet metal and roofing contractors within the district shall be invited. The purpose of these district meetings will be to form district associations.

ARTICLE III

Sec. 1. There will be a state code administration committee consisting of one association member from each district who shall be elected by a majority vote of members who maintain the district, state and national association.

Sec. 2. Recognizing that many sheet metal and roofing contractors do not at present maintain district, national and state memberships, it is hereby agreed that a vote be extended to non-members in the selection of the first code administration committee.

Sec. 3. There may be three nonmembers appointed by the president of this association to represent contractors not affiliated with the association on the state code administration committee.

ARTICLE IV

Sec. 1. A code authority committee consisting of five members of the association shall be elected by the code administration committee, for the period of one year.

Sec. 2. To avoid delay caused by the organization of district associations there shall be elected at this convention a temporary code authority committee of five members to act until such time as a code authority committee shall be elected as provided for in section I of this article.

ARTICLE V

District Code Authority Committees shall be selected by each district. The committees shall be subject to the approval of, and under the jurisdiction of the state and national code authority committees.

ARTICLE VI

Sec. 1. Membership in district, state and national associations shall be open to any person, firm or corporation conducting a roofing and/or sheet metal contracting business in the lower peninsula of Michigan. However, it is further agreed that where there are local associations affiliated with the district, state and national associations, membership is mandatory in the local association. Likewise membership in district, state and national association is mandatory on all members of local associations seeking recognition and authority to enforce the code of fair competition for this industry.

Sec. 2. It is further agreed that all members of local, district, state and national associations shall sign within ten days compliance to the National Code if and when it becomes effective.

ARTICLE VII

To provide members of the industry who are not members of the association an opportunity to make suggestions and criticisms, a meeting of all members of the industry in each district shall be held at least once in each three months.

ARTICLE VIII

Changes or additions to this resolution may be made by two-thirds vote of the state administrative committee at any regular meeting at which a quorum is present. Such changes or additions will be subject to the approval of the national code authority committee.

A quorum consists of seven members.

4

Air Conditioning Section

Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

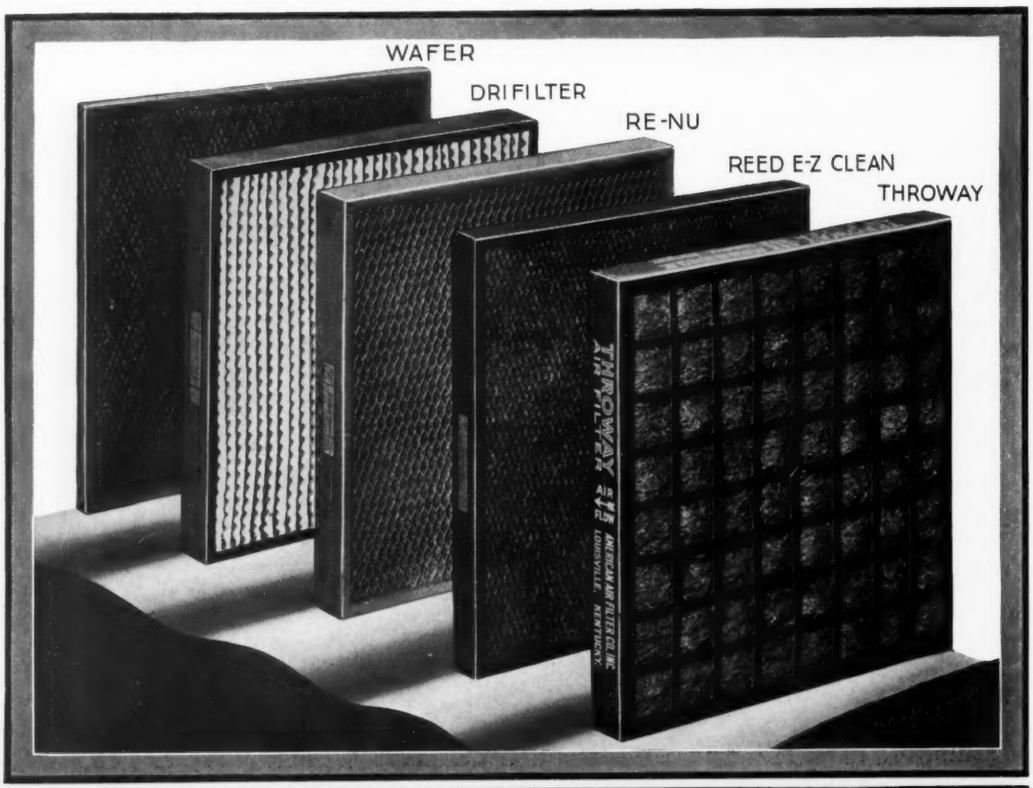
OPERATORS in the field of warm air heating and air conditioning seem pretty well divided between those who believe summer cooling is a wonderful chance to make money and those who see little or no opportunity for profit in cooling outside of the commercial field.

- - - - We believe that both sides are right and also wrong. Those who see little to interest them in cooling probably started by thinking cooling was our just due and that every householder would buy a full plant. Those who look for large profits may have to lower their sights and accept cooling by gradual stages.

- - - - Many important developments are taking place. For one thing we now understand that cooling is like winter air conditioning—an owner need not buy the whole proposition at one time: that cooling may be supplemented by low cost practices which reduce the big cooling cost.

- - - - During coming months articles dealing with these supplemental phases of cooling will be published.

AMERICAN AIR FILTERS



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THROWAY filter of heavy cardboard construction—to be discarded after it has served its maximum period of usefulness and replaced with a new filter unit — is highly suitable for warm air heating systems.

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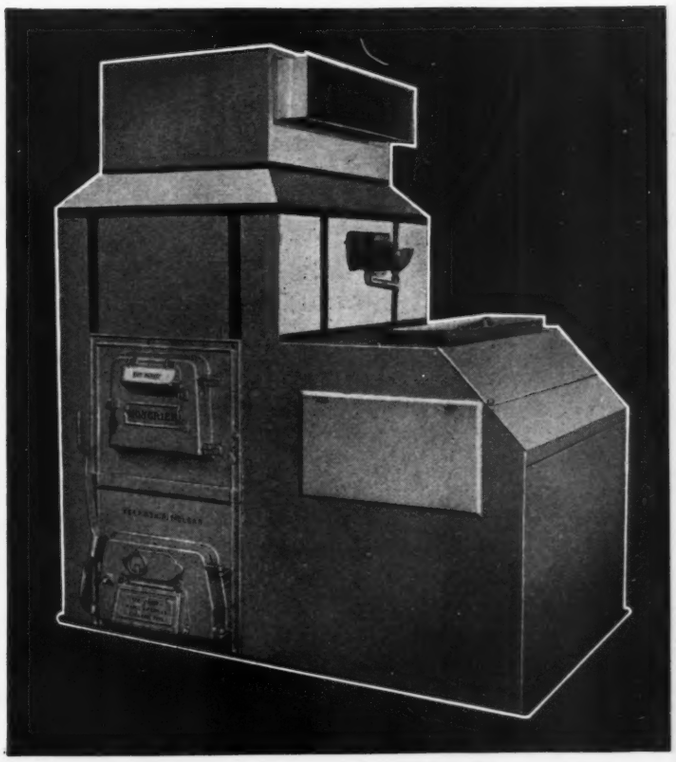

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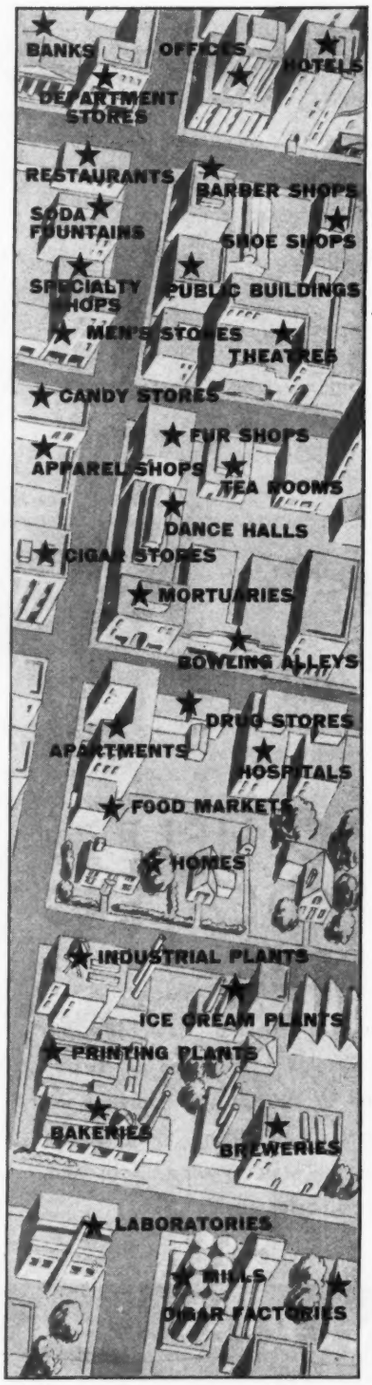

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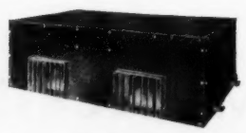

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Comfort Cooling With Attic Ventilating Fans

Ways and means of reducing initial and operating costs of comfort cooling are bound to occupy the center of the cooling stage this coming summer. One inexpensive method of reducing cost is by use of an attic ventilating fan which serves to reduce interior temperatures as rapidly as outside temperatures fall. The design of such a system, the various types of equipment needed and the results are presented in this article—the first of a series on this subject.

By G. B. Helmrich and G. H. Tuttle*

THE costs of cooling installations which have sufficient capacity to cool artificially a moderate-size residence are still high enough to restrict their use to a comparatively few people, while the desire for more comfortable conditions in the home during the hot summer season is almost universal. If a simple and relatively inexpensive means can be made commercially available, whereby at least the sleeping rooms may be made more comfortable at night, there unquestionably would be a broad market for such equipment.

This suggests the development of a method by which the outdoor air can be drawn through the rooms at such times as the temperatures are lower than those indoors. A study of the summer temperature records for Detroit shows that, almost invariably, the outdoor temperature drops below the inside temperature at around 7 to 8 p. m., and stays below for approximately 12 hours. The attic ventilating fan seemed to give such promise as a means of accomplishing this purpose that three types of residential installations were made during the past year and a half and considerable experience has been gained with their operation. The attic ventilating fan is by no means a new idea, but its possibilities seem to have been quite overlooked by nearly everyone.

In addition to providing more comfortable conditions for the second floor of the home, it was felt that an attic fan could be used to pull air through the first floor rooms during the early evening and thereby accomplish an appreciable improvement in the inside air condition usually existing after a hot summer day. It is then just one step further to install an attic fan of sufficient capacity to pull a large volume of air through both the first and second floor rooms and so cool down the building structure during the night that, with no artificial cooling during the following day, the conditions will be tolerable. It was with the thought that the attic ventilating fan might serve as a substitute for artificial cooling in many residences, where a moderate improvement to comfort would be most welcome, that this experimental work was undertaken.

*Engineers, The Detroit Edison Co., Detroit. *Paper presented at 40th Annual Meeting of A. S. H. V. E.*

The Fan Installations

The installations made in the Detroit residences were of three distinct types. One was a standard commercial propeller fan, the second a centrifugal multi-blade fan, and the third a centrifugal, steel plate, curved blade fan, installed without a scroll. The essential requirements for cooling systems of this kind are quietness of operation and low first cost. Fan efficiency is unimportant because of the comparatively short season of use.

Centrifugal Fan: A multi-blade centrifugal fan was installed in the attic space of an eight room house of brick and stucco construction. The suction side of the fan was connected to exhaust ducts leading to grilles placed in the ceilings of two bedrooms, the air being drawn through the open bedroom windows and discharged into the attic space where it flowed to the outdoors through louvres placed in the gables. The general arrangement is shown in Fig 1 and the principal data for the installation are shown in Table 1.

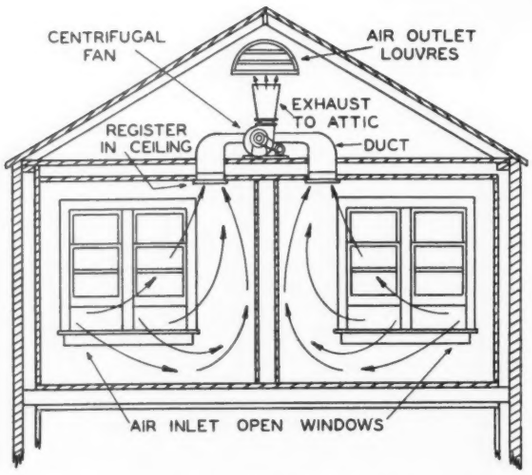

Fig. 1—Centrifugal multi-blade fan installed with exhaust ducts

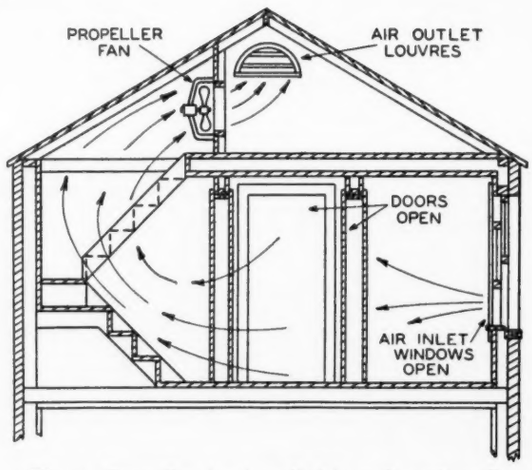

Fig. 2—Propeller fan installed in attic stair well

Propeller Fan: A 10-blade propeller fan of the disc type was installed at the head of the attic stairway of a six room house of ordinary frame construction. The fan was mounted over the attic stair well in such a manner that the entire attic stairway is placed under suction. The air is drawn through the open windows of the three bedrooms into a central hallway, and thence up the attic stairs where it is discharged into the attic space and allowed to find its way to the outdoors through open windows placed at either end of the attic. The general arrangement is shown in Fig. 2 and the installation data are given in Table 1.

Centrifugal Steel Plate Fan: In an endeavor to avoid some of the noise experienced with propeller fans, and at the same time overcome the obstacle of higher installation costs which are inherent in a system requiring duct work connected to a centrifugal fan, a rather unique fan assembly was devised. This assembly, shown in Fig. 3, consists of a single inlet, backward curved blade, steel plate type, centrifugal fan wheel, mounted on a light angle iron frame which supports the fan wheel, shaft, two bearings, V belt drive, and motor. No fan scroll was used and the inlet was placed close to a circular opening cut in a plaster board partition which served to divide a small attic space into a suction and discharge chamber. As in the case of the propeller fan installation, air is drawn up the attic stairway, into the fan wheel, and discharged freely from the blades into a small attic space, from whence it flows through open attic windows to the outdoors. The installation data for this fan are also to be found in Table 1.

Operating Results

The operating experience gained with these three installations during the past summer has shed considerable light on the possibility of popularizing this type of comfort cooling, and the data and experience will be discussed in the order in which the installations have just been described.

Centrifugal Attic Ventilating Fan: The centrifugal fan illustrated in Fig. 1 was operated about 150 hours during the past summer, and the occupants of the house were well pleased with the results obtained. The temperatures in the two bed rooms to which the fan is connected were very responsive to the action of the fan, and the characteristic temperature curve for the larger of the two rooms is shown in Fig. 4. It will be seen that the inside temperature can be made to follow the declining outdoor temperature curve very closely, the temperature at midnight being only about 2 degrees above that for the outdoors. This is in contrast to the

(*Continued on page* 48)

Table 1—Comparison of Attic Ventilating Fans in Residences

Type of Fan	Centrifugal Multi-Blade (Exhaust Duct System)	Propeller	Centrifugal Steel Plate Curved Blade—No Scroll
Diameter of Wheel—Inches	18	21¼	36
Capacity—cfm (as measured)	2754	3060	5040
Fan Speed—r. p. m.	300	900 600	320
Blade Tip Speed—r. p. m.	1415	5000 3300	3010
Motor Drive	½ hp Capacitor Start and Run—1140 r.p.m.—V-Belt Drive	Direct Connected to a 1/6 hp 900 r.p.m. A-C Motor	1/3 hp Capacitor Start and Induction Run—1715 r.p.m.—V-Belt Drive
Static Pressure of Fan—Inches of Water	0.10*	0.038**	0.11*
Volume of Space Ventilated—cubic feet	4600	5000	5800
Rate of Air Renewal—Changes per hour	36	37	52
Fan and Motor Mounting	Sponge Rubber Insulated Wood Platform	Bolted to Wood 2x4's faced with strips of felt	Welded Angle Iron Frame supported at four corners of 2"x2"x1" sponge rubber pads
Power of Input—Watts	320	252	375
Cfm per Watt Input	8.6	12.1	13.4
Power Consumption for Season 1933—kw-hr	48	14	....
Hours of Operation—1933	150	55	....

*Static pressure of fan is computed to be the static pressure at fan outlet plus static pressure (draft) at fan inlet minus velocity pressure at fan inlet; draft gauge mounted in the attic in all cases.

**Static pressure readings, on the suction and discharge side of the fan, were taken where air velocities were negligible, consequently no correction for velocity head is made; draft gauge mounted in the attic.

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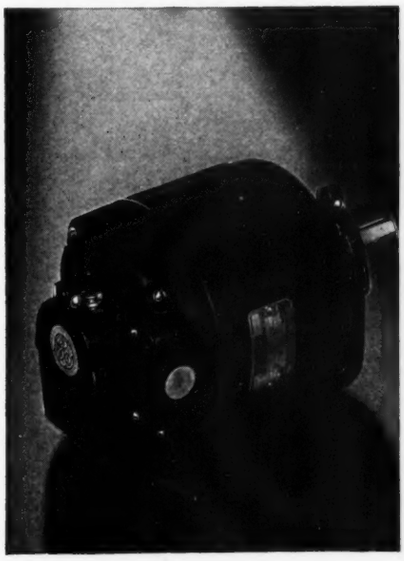

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If you have a large task for a little valve, this valve will save you money.

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MOTOR STARTING SWITCH
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AFTER OVERLOAD TURN KNOB TO OFF THEN TO ON
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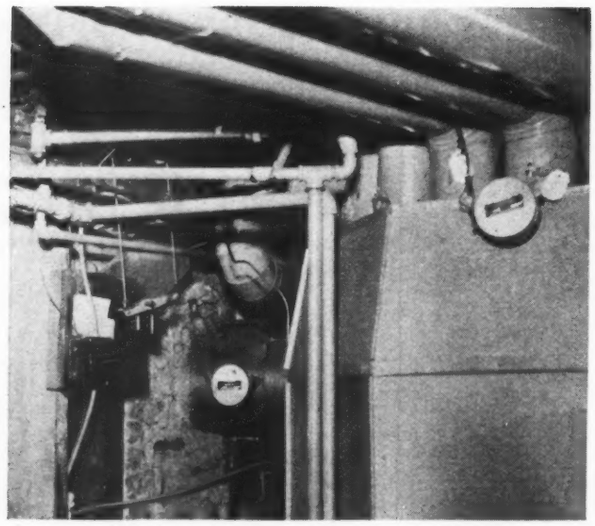


Operating Results For American Artisan Test House No. 1 Under Three Popular Control Systems

By Platte Overton

WHEN the temperature control system for the first AMERICAN ARTISAN test house was outlined, economy in first cost was the guiding factor. This eliminated a zone control system which seemed best suited to the arrangement of rooms and size of house and it was determined to study the effect of various control arrangements as recommended by contractors, engineers, manufacturers and the writer's past experiences.

Up to the present date only three control systems have been tested and no great variation in results have been noted. This is no doubt due to some extent to the size of the test house, the type of system, the gravity effect (See A. A. March issue) and the heat regain from the large area of the smoke flue in the rooms through which it passes.

The Three Systems

The three control systems so far observed may be briefly described as follows:

A—Thermostatic Control of Dampers—Fan operated by fan switch in accordance with plenum chamber temperatures.

B—Thermostatic control of dampers—Limit control in smoke pipe operating on temperature of products of combustion—Fan operated by fan control in accordance with plenum chamber temperatures.

C—Two bladed thermostat—1 blade operating dampers subject to a limit control in the smoke pipe. The other blade operating the fan subject to the fan switch in the plenum chamber of the furnace. Thermostat arranged so that after the dampers are closed on increasing temperature the thermostat will shut off the fan on a further increase of 2 degrees. Conversely on a decreasing temperature the thermostat turns on the fan providing the plenum chamber contains sufficient heat and after a further decrease of 2 degrees opens the dampers. Both blades of the thermostat are adjusted with the same adjustment but operate 2 degrees apart at all settings.

It will be necessary to bear in mind that the following test results do not carry any recommendations for contractors. They are merely the reports of the findings of these three particular arrangements, in this one particular house which admittedly has an unusual system.

If the tests prove any one thing it is that no one "packaged unit" of controls may be installed indiscriminately on all types of warm air systems. This is an opinion and subject to change with time and development in the control industry.

The control results to date may be termed fair—perhaps not the best possible. However, they satisfy the owner and are doing all that can be expected of a simple, inexpensive control system with one thermostat.

The three arrangements are shown in Figs. 3-4-5. For the first 7 hours of the test on February 21st, control hook-up (A) as shown in Fig. 3 was used. It will be seen that the thermostat in this arrangement has no connection with the fan circuit. The fan was operated by the bonnet temperature only, turning on at 185 degrees and off at 145 degrees. The draft dampers were opened for long periods and the stack temperatures went as high as 700 degrees during these periods.

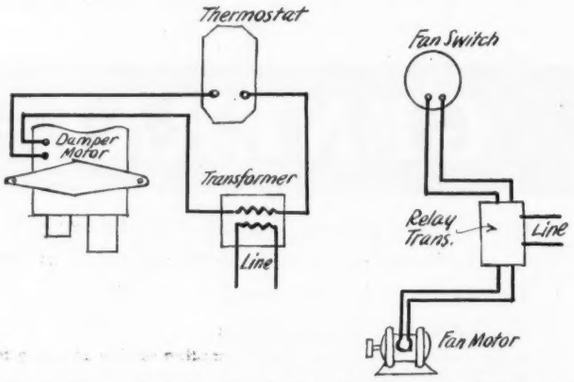


Fig. 3—Control system for first test. The room thermostat operates the damper; the fan is controlled by a bonnet switch; no inter-connection between circuits. No limit control was used. The text explains the results.

However, in this connection it must be remembered that the smoke flue passes up through the center of the house and much of this "lost" heat was regained in the area adjacent to this flue. As there was no control of this temperature these rooms overheated. Although a stack control probably would have reduced this over-run, no great over-ride in temperature resulted in the balance of the rooms—1½ degrees being the maximum

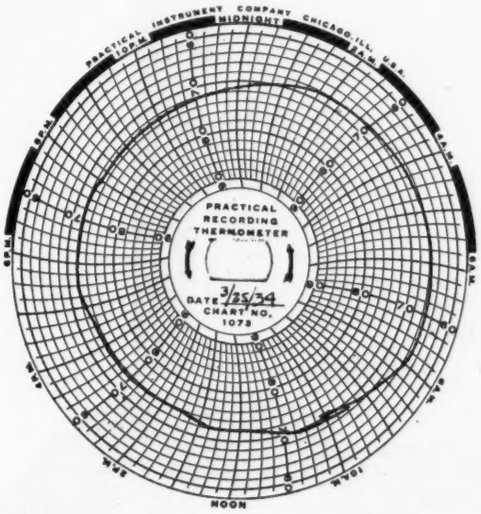


Fig. 6—Twenty-four hour recording thermometer chart showing temperatures in room 201, the hardest room in the house to heat, under control hookup B, shown in wiring diagram in Fig. 4, with two circuits, the damper circuit having a limit control.

at the thermostat. The over-run might have been higher on a mild day.

For another 7 hours' test made March 25th a stack limit control was installed as shown in Fig. 4. With this hook-up (B) the dampers were opened and closed frequently by the stack limit control and a much lower stack temperature resulted, such temperatures being maintained between 450-500 degrees. The control of the fan was as shown in Fig. 4.

With hook-up B, delivery temperatures, plenum chamber temperature and duration of fan operations were practically identical to those under hook-up A. This indicated that performance was not affected by lowering

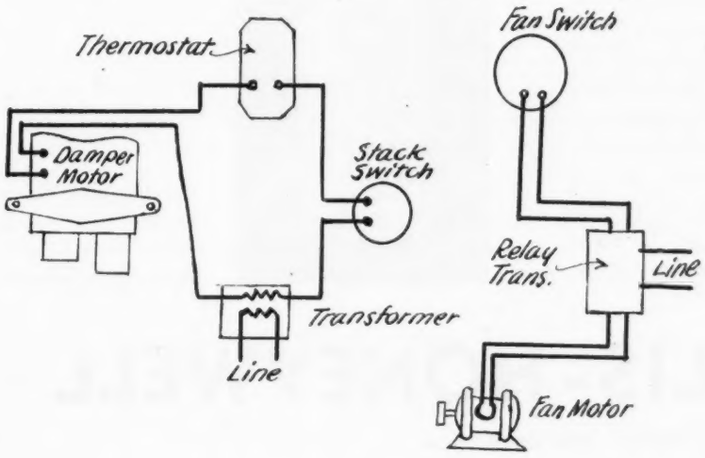


Fig. 4—This second hookup (B) is much like (A) except a limit control was placed in the damper circuit. The idea was to shut down the fire before the thermostat was satisfied. More uniform temperatures with less fuel consumption resulted.

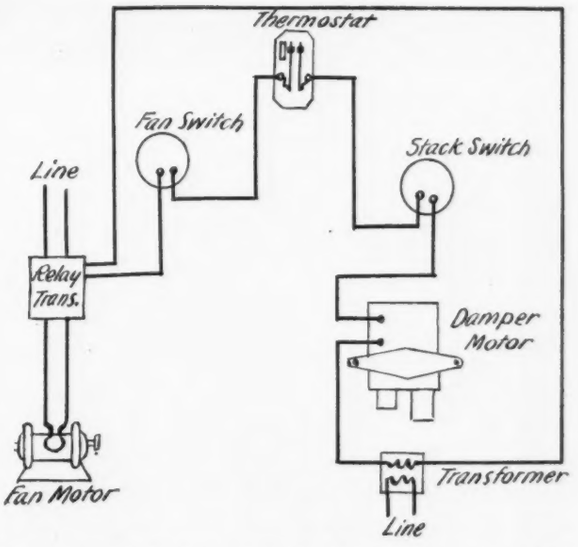


Fig. 5—In this hookup a two-bladed thermostat with a limit switch in the damper circuit was so wired that the thermostat was the master control. When the thermostat was satisfied the whole system shut down. See text for operating characteristics.

the stack temperatures and that the furnace delivered the same amount of useful heat. Seemingly, the economy and efficiency of the job was increased with no penalty. The stack limit control functioned as an operating control governed by fire conditions preventing runaway fire and excessive loss of heat up the chimney. Also this arrangement kept the fire under control so that it was more quickly checked when the thermostat was satisfied and closed the damper.

Fig. 6 is a 24-hour record of room 201, the hardest room in the house to heat, with this hookup.

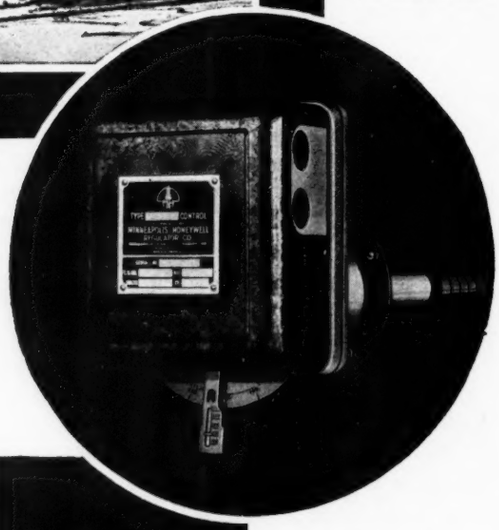
Bonnet Limit Control

It was suggested by several observers that the limit control be first tested in the bonnet, but the writer's past experience would not approve of this location. He had found that on the closely cased, high velocity, small pipe, forced air systems of this type with a limit control located in the plenum chamber, that the limit switch would not ordinarily *close the dampers with the fan running* as the fan removed the heat from the casing as fast as it was produced. If the limit switch were set low it might function at times, but would interfere with the fan operation by lowering the bonnet temperature. The limit switch is a fire control and the designer of the system decided that its place was in the smoke stack. The results on these unusual test installations have tended to prove his theory. What is the effect on the average job has not been tested.

(*Continued on page 42*)

◆ ◆

The First Presbyterian Church, at Rochester, Minnesota. Inter-Denominational Architectural Service, New York City, Architects; Ellerbe & Co., St. Paul, Associate Architects.



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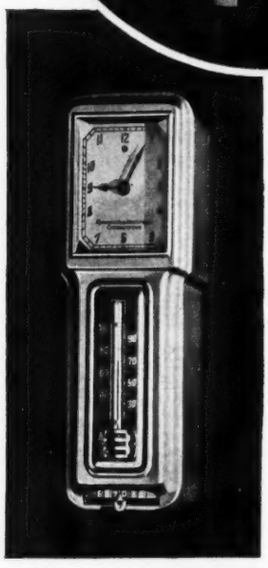

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Control Systems

Automatic Firing Develops With Air Conditioning

Air conditioning, with the warm air furnace as the "heart" of the system, and humidification, positive air circulation, cleaning and cooling providing healthful conditions, has focused public attention on all forms of automatic firing.

With the equipment now on the market, the air conditioning contractor can give the homeowner as many degrees of conditioning as the owner desires or complete conditioning. In these steps to complete conditioning, no one step perhaps is more important or appealing than the convenience and comfort afforded by automatic firing—by oil burners, stokers or gas burners.

Automatic firing has, therefore, received wide attention and many are the developments in automatic firing devices themselves.

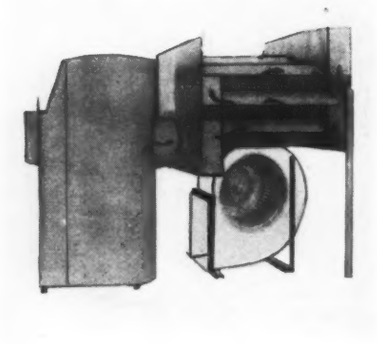
In this issue in the following pages American Artisan presents in reference data form these developments as they are found in oil burning. Here the contractor will find a comprehensive showing of furnaces especially designed for oil burning; combination burner and furnace units, both forced air and gravity; a listing of standard furnaces adapted to oil; and a data sheet on the burners themselves.

This review of equipment available is impressive in its evience of what the warm air furnace industry has to offer the public in healthful, convenient, economical heating and air conditioning.

Matched Burner and Furnace Units

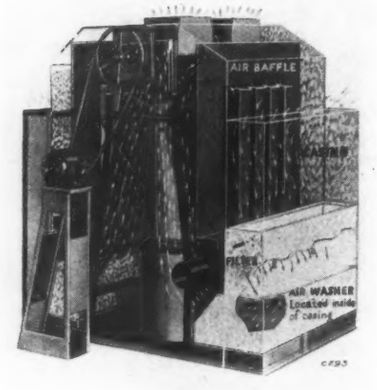
The Bryan Plumbing & Heating Co., Bryan, Ohio

Trade name of unit—Bard Oil Furnace.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Fan, Filters, Washer.
Ratio, heating surface to grate area—26 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity—(Btu per hour output at bonnet)—215,000.
Casing—Furnished; Shape—Square; Finish—Nile Green Enamel; Included in selling price.



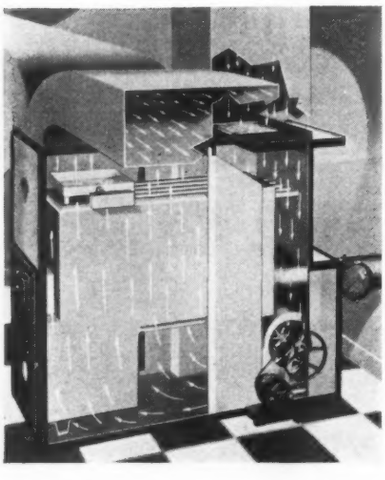
Campbell Heating Co., Des Moines, Iowa

Trade name of unit—Campbell's Winter-Chaser.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Long fire travel; Large heating surface; Jointless construction; Quick radiation.
Accessories furnished—Fan, Blower, Controls, Filters, Humidifier.
Ratio, heating surface to grate area—46 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—150,000 (at register).
Casing—Furnished; Shape—Rectangular; Finish—Green; Included in selling price.



Dail Steel Products Co., Lansing, Mich.

Trade name of unit—Dailaire.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Long fire travel; Large radiating surface; Wedge-shaped dome.
Accessories furnished—Fan, Blower, Controls, Filters, Washer, Humidifier, Cooling Unit or Coils.
Ratio, heating surface to grate area—(Not specified).
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—
Casing—Furnished; Shape—Square; Finish—Lacquer; Included in selling price.

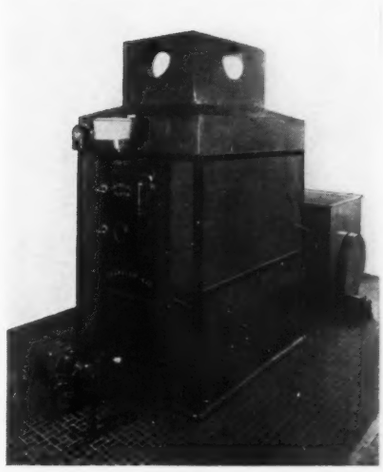


The George Evans Corporation, Moline, Ill.

Trade name of unit—Evansway.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Slot type fire and air flues conduct heat rapidly.
Accessories furnished—Blower, Filters, Humidifier.
Ratio, heating surface to grate area—No grate, Radiating surface 12,988 sq. in.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—.5 to 1.
Capacity (Btu per hour output at bonnet)—170,000.
Casing—Furnished; Shape—Square—insulated; Finish—Green paint; Included in selling price.

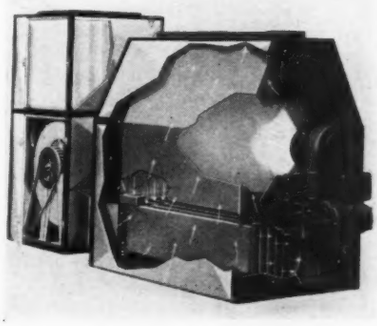
Chandler Co., Cedar Rapids, Iowa

Trade name of unit—Chandler Health Master.
General construction—Cast iron.
Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.
Ratio, heating surface to grate area—20.1 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—Not specified.
Casing—Furnished; Shape—Square; Finish—Red Crystal; Included in selling price.
Name of burner used—Autocrat.
Type of burner—Gun.
Capacity of burner—Sized to suit furnace.
Combustion chamber—Furnished; Type—Firecrete.



Gar-Wood Industries, Inc., Detroit, Mich.

Trade name of unit—Tempered-Aire.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Burner, Firebox, Economizer, Filters, Humidifier, Blower, Controls.
Ratio heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—70 cu. ft. per lb. oil per hour.
Capacity (Btu per hour output at bonnet)—165,000 to 300,000.
Casing—Furnished; Shape—Rectangular; Finish—Red and Black Lacquer; Included in selling price.
Name of burner used—Own.
Type of burner—Special pressure burner.
Capacity of burner—Fixed for each model.
Combustion chamber—Furnished; Type—Special cone-shaped refractory bowl designed as unit with burner.

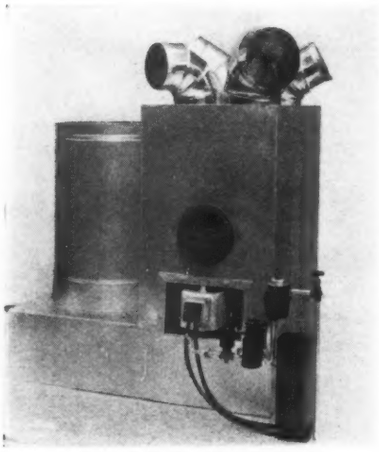


Green Foundry & Furnace Wks., Des Moines, Iowa

Trade name of unit—Colonial.
General construction—Cast Iron; Double Radiator Type; Joints—Double Metal Contact Sealed.
Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet—75,000 to 300,000.
Casing—Furnished; Shape—Square; Finish—Crinkle Green or Galvanized; Included in selling price.
Name of burner used—Colonial Super-Quiet.
Type of burner—Gun.
Capacity of burner—1 1/2 to 9 gal. per hour.
Combustion chamber—Furnished; Type—Fire Brick.

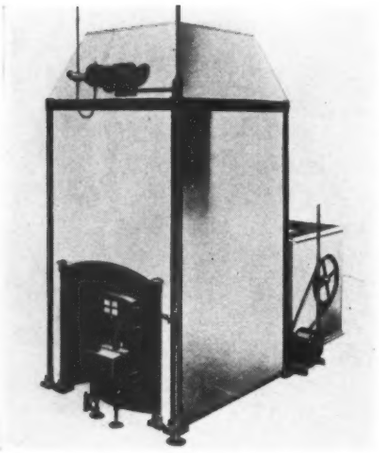
Ingle Manufacturing Co., San Diego, Calif.

Trade name of unit—Ingle Valjean Process Oil Burning Furnace.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Fan, Blower, Controls, Humidifier.
Ratio, heating surface to grate area—22 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—21,000 to 336,000.
Casing—Furnished; Shape—Round; Finish—Asbestos covered; Included in selling price.
Name of burner used—Ingle Valjean Process.
Type of burner—Carburetor, gravity.
Capacity of burner—1/3 to 4 gal. per hour.
Combustion chamber—Furnished; Type—Steel.



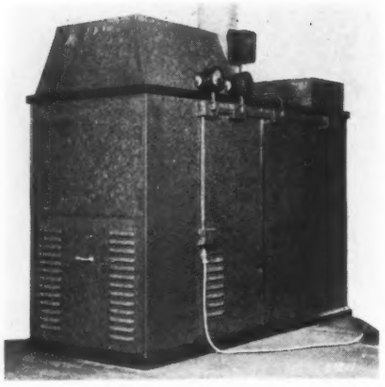
H. C. Little Burner Co., Inc., San Raphael, Calif.

Trade name of unit—H. C. Little Oil Burner Furnace Unit.
General construction—Steel; Joints—Welded; Uses fins.
Accessories furnished—Humidifier.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 1.
Capacity (Btu per hour output at bonnet)—Size A—70,000; Size B—140,000; Other sizes to 490,000 input.
Casing—Furnished; Shape—Oblong; Finish—Galvanized; Included in selling price.
Name of burner used—H. C. Little.
Type of burner—Gravity.
Capacity of burner—1/2 gal. to 5 gal. per hour.
Combustion chamber—Furnished; Type—Built into unit.



Motor Wheel Corp., Lansing, Mich.

Trade name of unit—M. W. Weather Control.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Blower, Controls, Humidifier. (Filters and Washer optional.)
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—89,700 to 179,400.
Casing—Furnished or not Furnished; Shape—Square or Round; Finish—Galvanized or Lacquer; Galvanized only included in selling price.
Name of burner used—Own.
Type of burner—Gravity.
Capacity of burner—(3/4 to 1 1/4)—(1 1/4 to 1 3/4)—(1 3/4 to 2 1/8).
Combustion chamber—Furnished; Type—Steel.



Oil Burner Builders, Inc., Rock Island, Ill.

Trade name of unit—Everedy Automatic Air Conditioning Unit.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Designed specially for oil fire application.
Accessories furnished—Blower, Controls, Filters, Humidifier.
Ratio, heating surface to grate area—21 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—130,000.
Casing—Furnished; Shape—Rectanguar; Finish—Green, Crackle or selection of other colors; Included in selling price.
Name of burner used—Oil Burner Builders'.
Type of burner—Gun.
Capacity of burner—Up to 2 1/4 gal. per hour.
Combustion chamber—Furnished; Type—Brick.

Perfection Stove Co., Cleveland, Ohio

Trade name of unit—Superfex Air Conditioning Furnace, No. 140E.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Blower, Controls, Thermostat, Filters, Humidifier, Valves.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 1.32.
Capacity (Btu per hour output at bonnet)—115,000.
Casing—Furnished; Shape—Rectangular; Finish—Enamel and Stainless Steel; Included in selling price.
Name of burner used—Own.
Type of burner—Gravity.
Capacity of burner—.10 to 1.25 gal. per hr.
Combustion chamber—Furnished—Type—Welded Steel.

Trane Company, La Crosse, Wis.

Trade name of unit—Climate Changer.
General construction—Cast iron; Joints—Cup; Uses fins.
Accessories furnished—Blower, Controls, Filters, Humidifier.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—125,000 to 200,000.
Casing—Furnished; Shape—Rectangular; Finish—Enamel; Included in selling price.
Name of burner used—Trane.
Type of burner—Gun.
Capacity of burner—1 to 3 gal. per hour.
Combustion chamber—Furnished; Type—Part of Oil Burning Unit.

◆

American Furnace Co., St. Louis, Mo.

Trade name of unit—AFCO Air Stream Automatic Conditioner.
General construction—Steel; Joints—Welded; No fins.
Accessories furnished—Blower, Controls, Filters, Humidifier.
Ratio, heating surface to grate area—20.2 to 1.
Ratio, cubic feet of combustion chamber to 1 pound of oil burned per hour—1 to .71.
Capacity (Btu per hour output at bonnet)—150,000 to 155,000.
Casing—Furnished; Shape—Rectangular; Finish—Green Enamel; Included in selling price.
Type of burner—Atomizing.
Capacity of burner—1/2 to 2 gal. per hour.
Combustion chamber—Furnished; Type—Brick.

Cary Manufacturing Co., Waupaca, Wis.

Trade name of unit—Cary Oil Heating Radiator.
General construction—Steel; Joints—Welded; Uses fins.
Accessories furnished—Blower, Washer.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 pound of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—45,000 to 810,000.
Casing—Furnished; Shape—Round; Finish—Duco; Included in selling price.
Name of burner used—Cary power air high-low flame.
Type of burner—Gun.
Capacity of burner—3/4 to 10 gal. per hour.

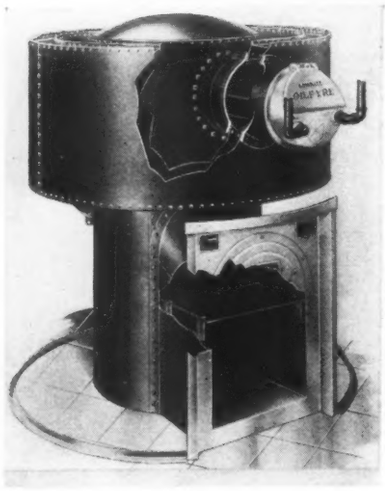
◆

Montag Stove and Furnace Works, Portland, Oreg.

Trade name of unit—Montag.
General construction—Steel Joints—Welded; No fins.
Accessories furnished—None.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 pound of oil burned per hour—1 to 1.
Capacity (Btu per hour output at bonnet)—128,000.
Casing—Furnished; Shape—Square; Finish—optional; Not included in selling price.
Name of burner used—Montag.
Type of burner—Gun.
Capacity of burner—1 to 7 gal. per hour.
Combustion chamber—Furnished (built in); Type—Fire brick

The preceding pages portrayed and gave specifications for matched oil burner and furnace units sold together as a complete automatic firing system. An equally important group of apparatus includes furnaces especially designed for oil burning and oil burner application. Such furnaces usually take any type burner and give excellent efficiency records. A showing of such units follows.

Special Oil Burning Furnaces For Any Burner



Lennox Furnace Co., Inc., Marshalltown, Iowa

Trade name of unit—Oilfyre.

General construction—Steel; Joints—Riveted and Caulked; No fins.

Features which make furnace especially adaptable to oil burner application—Abundance of heating surface; Long gas travel; Gas tight construction.

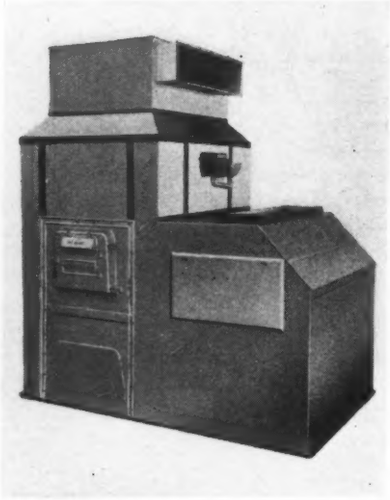
Accessories furnished—Available either in Gravity or Winter air conditioning types.

Ratio, heating surface to grate area—72.2 sq. ft. and 91.3 sq. ft. of heating surface.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—9 to 1.

Capacity (Btu per hour output at bonnet)—125,000 to 175,000.

Casing—Optional; Shape—Round or Square; Finish—Baked Enamel; Included in selling price.



The Henry Furnace and Foundry Co., Cleveland, Ohio

Trade name of unit—Moncrief Aristocrat.

General construction—Steel; Joints—Riveted and Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Complete Air Conditioning Equipment.

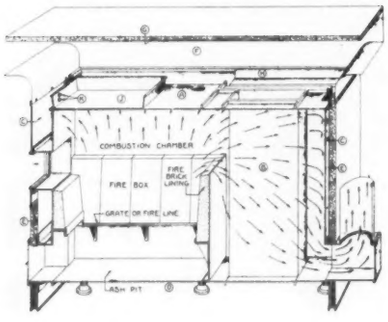
Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.

Ratio, heating surface to grate area—29 to 1 to 17 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)

Capacity (Btu per hour output at bonnet)—81,600 to 221,200 on forced air.

Casing—Furnished; Shape—Rectangular; Finish—Aluminum; Included in selling price.



Hess Warming & Ventilating Co., Chicago, Ill.

Trade name of unit—Hess Welded Steel Furnace and Hess Climate Master.

General construction—Steel; Joints—Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Steel Radiating Surface; Welded Seams; Firebrick Lining; Large Area of Heating Surface in Relation to Oil Burned.

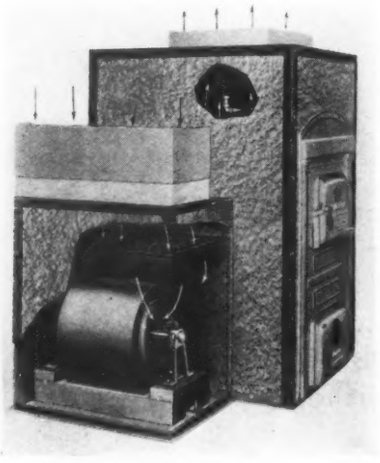
Accessories furnished—Optional.

Ratio, heating surface to grate area—20 to 1 to 42 to 1 (7 sizes).

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1.0 to 1 to 1.8 to 1.

Capacity (Btu per hour output at bonnet)—116,000 to 1,000,000.

Casing—Furnished; Shape—Square; Finish—Galvanized Iron or Enamel; Included in selling price. (Additional charge for enamel finish.)



The Fox Furnace Company, Elyria, O.

Trade name of unit—Sunbeam Air Conditioning Units, Series 60 and Series 70.

General construction—Steel; Joints—Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Long fire travel; Amount of heating surface; Fume tight construction.

Accessories furnished—Blower, Controls, Filters, Humidifier.

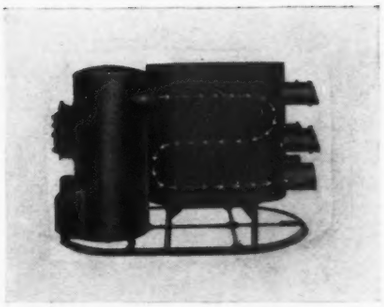
Ratio, heating surface to grate area—Approximately 25 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)

Capacity (Btu per hour output at bonnet)—123,000 to 283,000.

Casing—Furnished; Shape—Round or Square; Finish—Crystalline Baked Enamel or Galvanized Iron; Included in selling price.

Liberty Foundry Co., St. Louis, Mo.



Trade name of unit—Mellow-Aire.

General construction—Steel; Joints—Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Long fire travel, heat trap radiators.

Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.

Ratio, heating surface to grate area—(Not specified.)

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)

Capacity (Btu per hour output at bonnet)—60,000 to 200,000.

Casing—Furnished; Shape—Round or Rectangular; Finish—Laquer; Included in selling price.

The Meyer Furnace Co., Peoria, Ill.

Trade name of unit—Weir.

General construction—Steel; Joints—Riveted—Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Tightness; Long fire travel; Large heating surface; Thermostatic damper.

Accessories furnished—Controls, Filters, Washer, Humidifier, as extras.

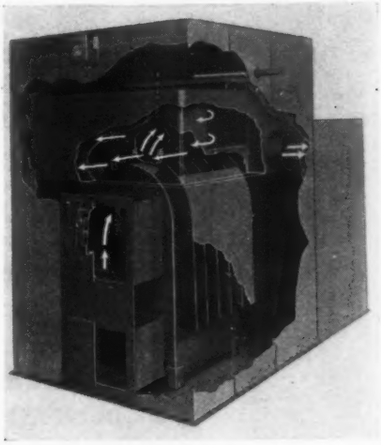
Ratio, heating surface to grate area—19.4 to 41.2, according to size.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—5.76 to 13.0, according to size.

Capacity (Btu per hour output at bonnet)—122,000 to 266,000.

Casing—Optional; Shape—Round or Square; Finish—Galvanized or Paint; Included in selling price.

Premier Warm Air Heater Co., Dowagiac, Mich.



Trade name of unit—Premier Automatik Furnace.

General construction—Steel; Joints—Welded; Uses fins.

Features which make furnace especially adaptable to oil burner application—Welded gas tight; Large combustion chamber; Heat transfer fins; Bottom off floor; Heat extractor.

Accessories furnished—Optional.

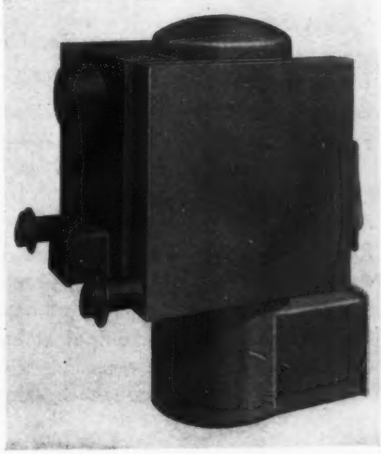
Ratio, heating surface to grate area—(Not specified.)

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—7 to 1.

Capacity (Btu per hour output at bonnet)—183,750 to 367,500.

Casing—Furnished; Shape—Square; Finish—Laquer or plain; Included in selling price.

Round Oak Furnace Co., Dowagiac, Mich.



Trade name of unit—Oil Master.

General construction—Steel; Joints—Welded and caulked; No fins.

Features which make furnace especially adaptable to oil burner application—Large radiation surface, long fire travel, rapid transmission of heat.

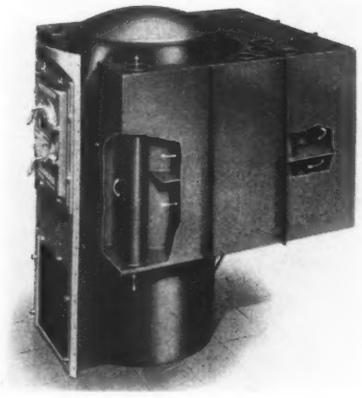
Accessories furnished—None.

Ratio, heating surface to grate area—61.16 to 1; 47.12 to 1; 40.39 to 1; 35.75 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to .78; 1 to .86; 1 to 1; 1 to 1.8.

Capacity (Btu per hour output at bonnet)—81,600 to 214,500.

Casing—Furnished; Shape—Square; Finish—Special colors; Included in selling price.



The Waterman-Waterbury Co., Minneapolis, Minn.

Trade name of unit—Waterbury Seamless Oil Burning Furnace.

General construction—Steel; Joints—Welded; No fins.

Features which make furnace especially adaptable to oil burner application—Leak-proof, safe and odorless; Large combustion space; Long fire travel, and extensive heating surface.

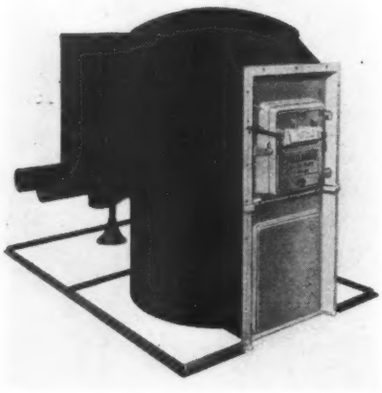
Accessories furnished—Accessories extra.

Ratio, heating surface to grate area—Unlined combustion dome cross sectional 32 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 0.8 (average brick firebox deducted).

Capacity (Btu per hour output at bonnet)—158,625: 211,500; 264,375; 317,250.

Casing—Furnished; Shape—Square; Finish—Galvanized; Included in selling price.



The Williamson Heater Co., Cincinnati, Ohio

Trade name of unit—De Luxe—Super Heater.

General construction—Steel; Joints—Riveted and welded; No fins.

Features which make furnace especially adaptable to oil burner application—Tight construction, long fire travel, large combustion space, large heating area.

Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.

Ratio, heating surface to grate area—30.28 to 1, 22.79 to 1 and 18.03 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Depends upon burner used).

Capacity (Btu per hour output at bonnet)—99,000 to 149,600.

Casing—Furnished; Shape—Rectangular; Finish—Red Crystalline; Included in selling price.

Standard Furnaces Adapted to Oil Burning

In addition to the special matched burner and furnace units and the furnaces designed particularly for the application of any type of burner, many manufacturers have taken their standard line and made these furnaces efficient for oil burning by increasing the radiating and secondary heating surfaces by adding heat economizers, extra large radiators, and so forth. A tabulation of specifications for a representative group of such units follows.

Armstrong Furnace Co., Columbus, Ohio

Trade name of unit—Armstrong De Luxe.

General construction—Steel; Joints—Riveted; No fins.

Features which make furnace especially adaptable to oil burner application—Narrow radiator with extreme wrap close coupled convector; well balanced unit.

Accessories furnished—None.

Ratio, heating surface to grate area—24 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)

Capacity (Btu per hour output at bonnet)—(Not specified.)

Casing—Furnished or not furnished; Shape—Round or Square; Finish—Green Crystal; Included in selling price (optional).

The Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio

Trade name of unit—Baker.

General construction—Steel; Joints—Welded; Fins and tubes used.

Features which make furnace especially adaptable to oil burner application—High ratio of radiating surface; designed to make change in fuels quick and easy.

Accessories furnished—Blowers, Filters, Controls.

Ratio, heating surface to grate area—30 to 1.

Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)

Capacity (Btu per hour output at bonnet)—(Not specified.)

Casing—Furnished; Shape—Square; Finish—Galvanized or painted; Included or not included in selling price.

Brown Sheet Iron & Steel Co., St. Paul, Minn.

Trade name of unit—Brunett's Heating System.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Heat Utilizer or Economizer.
Accessories furnished—None.
Ratio, heating surface to grate area—33 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 1.
Capacity (Btu per hour output at bonnet)—Made in several sizes.
Casing—Furnished; Shape—Square; Finish—Red and Brown; Included in selling price.

◆

Economy Baler Co., Ann Arbor, Mich.

Trade name of unit—Health Air.
General construction—Steel; Joints—Welded: Uses fins.
Features which make furnace especially adaptable to oil burner application—Long flue travel—automatic by-pass—quick heat transfer.
Accessories furnished—Fan, Blower, Controls, Filters, Washer, Hmidifier, etc.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 1.
Capacity (Btu per hour output at bonnet)—Up to 400,000.
Casing—Furnished or not furnished; Shape—Round or Square; Finish—Green or Red Enamel; Not included in selling price.

◆

Enterprise Boiler & Tank Wks., Chicago, Ill.

Trade name of unit—Pure Air.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Large combustion chamber and long flue travel.
Accessories furnished—Blower, Controls, Filters, Humidifier.
Ratio, heating surface to grate area—22.2 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—82,960 to 183,600.
Casing—Furnished; Shape — Square; Finish — Galvanized; Not included in selling price.

◆

Hall-Neal Furnace Co., Indianapolis, Ind.

Trade name of unit—Victor Special Oil-Burning Furnace.
General construction—Steel; Joints—Riveted and Welded; Uses fins.
Features which make furnace especially adaptable to oil burner application—Twin Radiator construction combined with patented fin Radiation.
Accessories furnished—To be added.
Ratio, heating surface to grate area—52 to 1 to 27 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—0.4 cu. ft. per 1 lb. oil burned per hour.
Capacity (Btu per hour output at bonnet)—89,575 to 183,100 on gravity; 119,400 to 244,100 on fan.
Casing—Furnished; Shape—Square; Finish—2-Color; Included in selling price.

Ideal Furnace Co., Detroit, Mich.

Trade name of unit—Ideal.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—(Not specified.)
Accessories furnished—None.
Ratio, heating surface to grate area—22 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—70,312 to 146,548.
Casing—Furnished or not furnished; Shape—Square or Round; Finish—Galvanized.

◆

Koons Furnace Co., Danville, Ill.

Trade name of unit—Koons.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Special furnace, large radiating surface.
Accessories furnished—Blower, Controls, Filters.
Ratio, heating surface to grate area—30 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—About 1 to 1.
Capacity (Btu per hour output at bonnet)—140,000 to 500,000.
Casing—Furnished; Shape—Rectangular; Finish—Red Lacquer; Included in selling price.

◆

P. H. MaGirl Foundry & Furnace Works, Bloomington, Ill.

Trade name of unit—Gibraltar.
General construction—Cast Iron; Joints—Sealed; No fins.
Features which make furnace especially adaptable to oil burner application—All Cast Iron, Sealed Joints, Increased Radiator Heating Surface and Gas Travel.
Accessories furnished—Blower, Controls, Washer, Humidifier (optional).
Ratio, heating surface to grate area—26 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—4 to 1.
Capacity (Btu per hour output at bonnet)—103,000 to 184,000.
Casing—Furnished; Shape—Rectangular; Finish—Crystalline; Included in selling price.

◆

Marshall Furnace Co., Marshall, Mich.

Trade name of unit—Marshall Boiler Plate and Marshall Air Conditioner.
General construction—Steel; Joints—Riveted and Welded; No fins.
Accessories furnished—Blower, Controls, Filters, Washer, Humidifier.
Ratio, heating surface to grate area—Average, 22½ to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—73,920 to 200,990.
Casing—Furnished; Shape—Round; Finish (none); Not included in selling price.

Milwaukee Welded Steel Corp., Milwaukee, Wis.

Trade name of unit—"Milwaukee."
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Series of Booster Flues Breaking Up Hot Gases.
Accessories furnished—(Optional.)
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—(Not specified.)
Casing—Furnished or not furnished (optional); Shape—Square; Finish—Galvanized; Not included in selling price.

◆

Pennsylvania Furnace & Iron Company, Warren, Pa.

Trade name of unit—Pennsylvania.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Large radiating surface and air tight joints.
Accessories furnished—(Furnished with or without equipment.)
Ratio, heating surface to grate area—32 to 1 to 18 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—Specified by leader pipe area.
Casing—Furnished; Shape—Round; Finish—Galvanized; Included in selling price.

◆

Rock Island Stove Co., Rock Island, Ill.

Trade name of unit—Royalaire.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Long fire travel (equivalent to 65 ft.); No down draft.
Accessories furnished—Fan or Blower, Controls, Filters, Humidifier, as extra equipment.
Ratio, heating surface to grate area—12 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to .47.
Capacity (Btu per hour output at bonnet)—269,684.
Casing—Furnished; Shape—Square; Finish—Green Painted; Included in selling price.

◆

W. W. Rosebraugh Company, Salem, Oregon

Trade name of unit—Pacific.
General construction—Steel; Joints—Welded.
Features which make furnace especially adaptable to oil burner application—Welded tight; long smoke travel in radiator.
Accessories furnished—(Not specified.)
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—(Not specified.)
Casing—(Not specified.)

Schwab Furnace and Mfg. Co., Cedar Grove, Wis.

Trade name of unit—Gilt Edge.
General construction—Cast Iron; Joints—Cup; No fins.
Features which make furnace especially adaptable to oil burner application—Heavy, Durable Castings—Large radiating surface.
Accessories furnished—None.
Ratio, heating surface to grate area—26 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—14,096.
Casing—Furnished; Shape—Round or Square; Finish—Plain; Included in selling price.

◆

James Spear Stove & Heating Co., Philadelphia, Pa.

Trade name of unit—Spear Distributor.
General construction—Cast Iron; Joints—T. & G.; Internal fins.
Features which make furnace especially adaptable to oil burner application—Extra large area of heating surface.
Accessories furnished—Blower, Controls, Filters.
Ratio, heating surface to grate area—50 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—1 to 0.45.
Capacity (Btu per hour output at bonnet)—100,000 to 400,000.
Casing—Furnished; Shape—Round; Finish—optional; Usually included in selling price.

◆

L. C. Thiele Co., Indianapolis, Ind.

Trade name of unit—Thiele.
General construction—Steel; Joints—Welded; No fins.
Features which make furnace especially adaptable to oil burner application—Long fire travel, direct smoke pipe for easy starting with cold stack.
Accessories furnished—None.
Ratio, heating surface to grate area—49 to 1.
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—Depends on type of oil burner and oil used.
Capacity (Btu per hour output at bonnet)—Depends on type of oil burner and oil used.
Casing—Furnished; Shape—Round; Finish—Galvanized; Included in selling price.

◆

The Thomas and Armstrong Co., London, Ohio

Trade name of unit—London Boiler Plate Furnace "Quality-Plus."
General construction—Steel; Joints—Welded and Caulked; No fins.
Features which make furnace especially adaptable to oil burner application—Welded Feature—Preventing Leakage—"Oil Tight."
Accessories furnished—Furnace only.
Ratio, heating surface to grate area—(Not specified.)
Ratio, cubic feet of combustion chamber to 1 lb. of oil burned per hour—(Not specified.)
Capacity (Btu per hour output at bonnet)—(Not specified.)
Casing—Furnished; Shape—Square or Round; Finish—As Desired; Included in selling price.

A Tabulation of Oil Burner Specifications

Name of Manufacturer	Trade Name of Burners	Type of Burners	Capacity Range of Burners	Type of Ignition	Require Special Grate or Plate-	Require Special Combustion Chamber-	Are Controls Included in Sales Price-
Advance Oil Burner Co.	Quarts	Pot Type Vaporizing	1-5 gal.	Gas or Oil Pilot	No	No	Yes—Thermostat and furnace
Anchor Post Fence Co.		Rotary	1-12 gal.				
Autocrat Oil Burner Corp.	Aut-O-Crat	Gun	1-14 gal.	Electric	No	Yes, fire brick or mold	Yes
Automatic Burner Corp.	ABC Mistolator	Rotary	1-20 gal.	Gas and Electric	No	Yes—Bowl	Yes
Badger Mfg. Co.	Badger	Gun	1.65-7.5 gal.	Electric	No	Yes—brick, sq. or round	Yes
Bennett Co.	Bennett-Allison	Gun	1½-20 gal.	Electric	No	Yes, brick lined	Yes
Berryman Oil Burner Co.	Berryman	Gun, Rotary, Pot Vapor	1-10 gal.	Gun, Elec.; Rotary, elec. and gas; Pot, gas	No	Gun, yes, fire brick	Yes
Bethlehem Foundry & Machine Co.	Bethlehem—Doe	Gun	1.35-21.5 gal.	Electric	No	Yes, fire brick	Safety controls only
Brown Oil Burning Equipment Co.	Brown Automatic	Gun	1-18 gal.	Electric	No	Yes, fire brick	Yes
Bryan Steam Corp.	Bryan	Rotary	2-15 gal.	Gas	No	No	Yes
The Caloroil Burner Corp.	Victory & Crescent	Rotary and Gun	1-6 and 1.35-35 gal.	Gas or Electric	No	Yes	Yes
California Oil Burner Co.	Sieverts	Pot Vaporizing	1 qt.-1 gal.	Manual or Gas	No	No	No
Carter-Korth Oil Burner Corp.	Carter-Korth	Gun and Rotary	1.3-30 gal.	Electric	No	No	Yes
Cary Mfg. Co.	Cary	Pot conversion	1-3½ gal.	High-Low Flame	No	No	Yes
Century Engineering Corp.	Century	Gun	1½-4 gal.	Electric	No	Yes	Thermostat and stack safety
Chalmers Oil Burner Co.	Chalmers	Gun	1-20 gal.	Electric	No	Yes	Yes
Cleveland Steel Products Corp.	Torridheet	Rotary and Gun	Rotary 1-16; Gun 1-3 gal.	Gas or Electric	No	Yes	Yes
Double Duty Oil Burner Co., Inc.	Double Duty	Gun	Up to 12 gal.	Electric	No	No	Yes
Easternoil, Inc.	Easternoil	Gun	1-14 gal.	Electric	No	Yes, brick	Yes
Electrol, Inc.	Electrol	Gun	Up to 3¾ gal.	Electric	No	Yes	Yes
Fairfield Oil Heating Co., Inc.	Fairfield	Gun	1.5-10 gal.	Electric	No	No	Yes
French Rotary Oil Burner Co.	French Automatic	Gun	1-3 gal.	Electric	No	No	Yes
Gar-Wood Industries, Inc.	Gar-Wood	Gun	1-10 gal., 1.65-2.50 gal.	Electric	In door	Yes, brick	Yes
Gilbert and Barker Mfg. Co.	Gilbarco	Gun	2-29.5 gal.	Electric	No	Yes, brick	Yes
Hardinge Oil Burner Co.	Hardinge	Rotary	½-60 gal.	Gas, Electric and Combination	Yes	Yes, brick	Yes
Hart Oil Burner Corp.	Hart	Gun	1½-16 gal.	Electric	No	Yes, brick	Some
The Heil Co.	Heil	Gun	1.35-20 gal.	Electric	No	Yes, brick	Yes
The Hipoint Corp.	Hipoint	Gun	1½-7 gal.	Electric	No	Yes, brick	Yes
Home Necessities Mfg. Co.	Goodhart	Gun	1-15 gal.	Electric	No	Yes, brick	Yes
Ingle Mfg. Co.	Ingle-Valjean Process	Carburetor Pot	½-6 gal.	Electric	No	No	No
S. T. Johnson Co.	Johnson	Rotary-horizontal	⅔-4 gal.	Gas and Electric	Yes	No	Yes
Johnston Mfg. Co	Johnston Short Flame	Gun	1.35-7 gal.	Electric	No	Yes, brick	Yes
Kais Oil Burner Mfg. Co.	Kais	Rotary and Pot	Rotary, ½-3. Pot, ½ pint-¾ gal.	Electric or Gas	No	With gun, yes	Thermostat only
Kelvinator Corp.	Kelvinator	Rotary and Gun	Rotary, ½-2 gal. Gun 1¼-5 gal.	Electric or Gas	No	Yes, brick	Yes
Kleen-Heat, Inc.	Kleen-Heat	Rotary and Gun	Gun, up to 27 gal. Rotary, ¾-1¾ gal.	Gas or Electric	No	No	Yes
H. C. Little Burner Co., Inc.	Little	Special Pot	½-5 gal.	Electric	No	No	Yes
Lynn Products Co.	Lynn	Gun	1½-6 gal.	Electric	No	No	Yes
May Oil Burner Corp.	Quiet May	Gun	1½-45 gal.	Electric	No	No	Yes
Malleable Iron Fittings Co.	Branford	Gun	1½-18 gal.	Electric	No	Yes, brick	Yes
McIlvaine Burner Corp.	McIlvaine	Pot, modulating flame	1-6 gal.	Manual	No	No	Yes
Montag Stove & Furnace Works	Montag	Gun	1-7 gal.	Electric	No	No	Yes
Morrissey & Co.	Morrissey	Gun	1½-9 gal.	Electric	No	Yes, brick	Yes
New England Oil Burner Co.	Yankee Maid and New England	Pot	3½ and 4 gal.		No	No	No
The Nu-Way Corp.	Genii	Gun	1¼-2; 1½-4; 3-7 gal.	Electric	No	Yes, brick	Yes
Old Colony Machine Works	Old Colony	Gun	3-9 gal.	Electric	No	No	Yes
Peerless Oil Burner Co., Inc.	Peerless	Pot		Generator	No	No	No
Ray Burner Co.	Ray	Rotary	½-2½ gal.	Gas or Electric	No	Yes, brick	Yes
Reif-Rexoil, Inc.	Rexoil	Gun	Up to 8 gal.	Electric	No	Yes, brick	Yes
Rotary Mfg. Co.	R. M. C. Rotary	Rotary	⅛-9 gal.	Manual	No	No	No
R-S Products Corp.	Ryan	Gun	1-8; 6-15; 8-32 gal.	Electric	No	Yes, brick	Yes
The S-K Co., Inc.	S-K	Gun	1½-15 gal.	Electric	No	No	Yes
Simplex Oil Heating Corp.	Simplex	Gun	Up to 30 gal.	Electric	No	Yes, brick	Yes
Sundstrand Engineering Co.	Sunstrand	Gun	1½-4½ gal.	Electric	No	No	Optional
Taft Oil Burner Co.	Taft	Gun	Up to 5 gal.	Electric	No	Yes, brick	Yes
Timken Silent Automatic Co.	Timken Silent Automatic	Rotary	½-7 gal.	Electric	No	Yes, brick	Yes
Uni-Fire Co.	Uni-Fire	Rotary	¼-2½ gal.	Gas	No	No	Yes
Victor Products Corp.	Torvic	Vertical Pressure Atomizing	1.35-12 gal.	Gas or Electric	No	No	Yes
Wayne Oil Burner Corp.	Wayne Mistoil	Gun	1-20 gal.	Electric	No	Yes, brick	Yes
The Wheland Co.	Russell Automatic	Gun	½-1½ gal.	Electric	No	Yes, brick	Yes
Williams Oil-O-Matic Heating Corp	Oil-O-Matic	Gun	½-30 gal.	Electric	No	Yes, brick	Yes
York Oil Burner Co., Inc.	York	Gun	1.35-35 gal.	Electric	No	Yes, brick	Yes

What Is This Thing Called "Comfort"

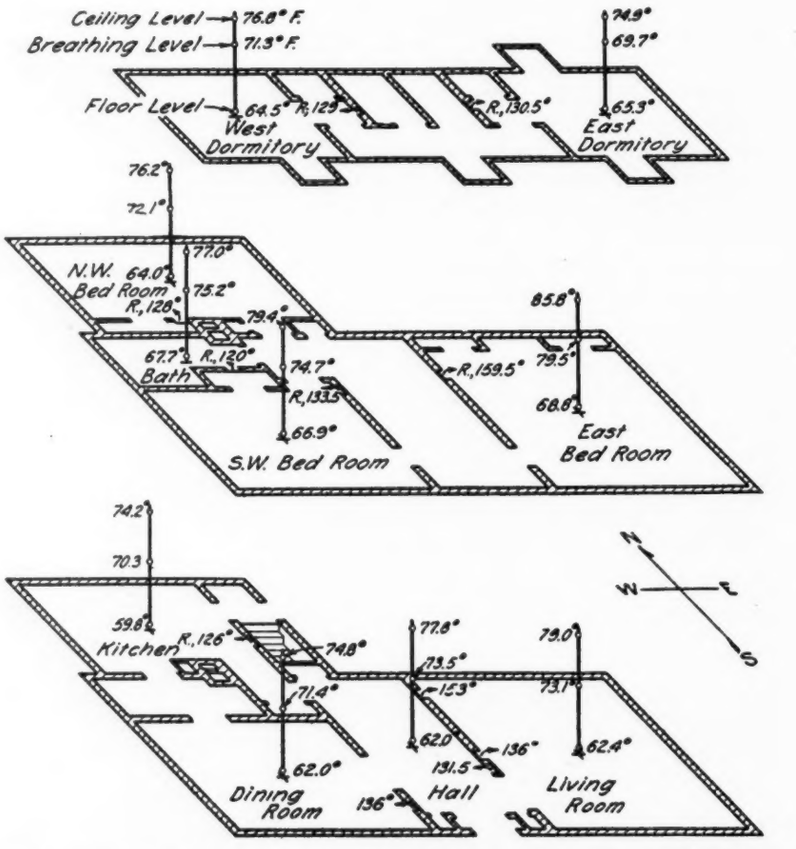
By A. P. Kratz
Research Professor
Department of Mechanical Engineering
University of Illinois

One of the chief faults in intermittent fan systems is stratification—resulting in cold floors and hot ceilings. How this condition effects "comfort" and what the temperature variations actually are form the basis of this chapter.

FROM the preceding discussion it may be concluded that a thermometer placed at the 5-ft. level may give an incorrect indication of the degree of comfort experienced in the room, and that while a certain amount of deviation from the true index is characteristic of nearly all heating plants, the extent of the deviation is influenced by the type of the heating units or heating system. All indications point toward the fact that it would be better practice to locate the thermometer at the 30-in. level rather than at the 5-ft. level.

The same principles apply even more forcibly to the location of the control thermostat than to the location of the thermometer. If the thermostat is placed at the 5-ft. level, and conditions are not complicated by other factors, a comfortable temperature may be maintained at the 5-ft. level, but a lower temperature in the living zone will exist, resulting from the normal temperature gradient in the room. Unfortunately this situation is further complicated by other factors. The thermostat can not act to open the dampers, or start the burner, until the air at the 5-ft. level has cooled to the temperature predetermined by the setting of the thermostat. Meanwhile the dampers remain closed, or the burner remains off, and practically no heat enters the room. At the same time cold outdoor air enters through cracks in the window and door frames, and the air in contact with the cold glass becomes chilled. All of this cold air collects as a pool near the floor, and, if the off-periods extend over a considerable time, the temperature gradient becomes much more pronounced than it is during the periods when the heater is in actual operation. Hence, during the off-periods the room may become decidedly cold before the thermostat acts to furnish more heat. This condition, sometimes known as the "cold 70," is more prevalent with gas and oil fired systems than with coal fired; because in the latter case the heat stored in the fuel bed continues to be supplied to the room even when the dampers are closed, but in the former case the heat supply ceases soon after the burner becomes inoperative. This condition can be improved by placing the thermostat at the 30-in. level, and by adjusting it to decrease the length of the off-periods.

A good example of the temperature difference between floor and ceiling is shown in the drawing made from tests showing differences in the Research House.



The three floor plans above show dry bulb temperature readings for the three floors of the Research Residence. In addition, three height readings were made in each room with results obtained as shown by the readings. Two thermostats were used to obtain this condition. Note the gradient between floors and ceilings.

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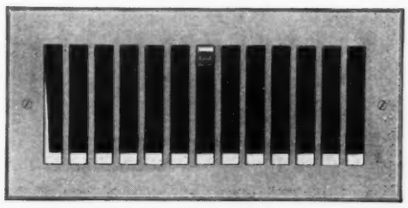

WITH the addition of the new No. 60 Grille Design shown and described herewith, the H & C line now offers four attractive grille designs, all available in one and three piece Sidewall and Baseboard Registers, with Intakes to match.

Both with and without the cross bar, the No. 60 Grille is conservatively attractive and offers the maximum free area that is consistent with good construction. A trial will convince you that the H & C valve mechanism and general construction are surpassed by none.

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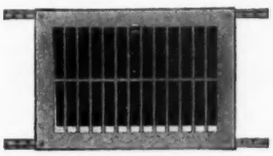

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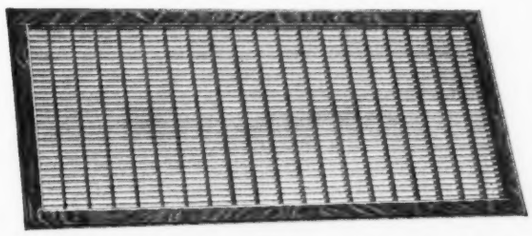
Size of Openings $1\frac{7}{16}$" x $\frac{5}{16}$"



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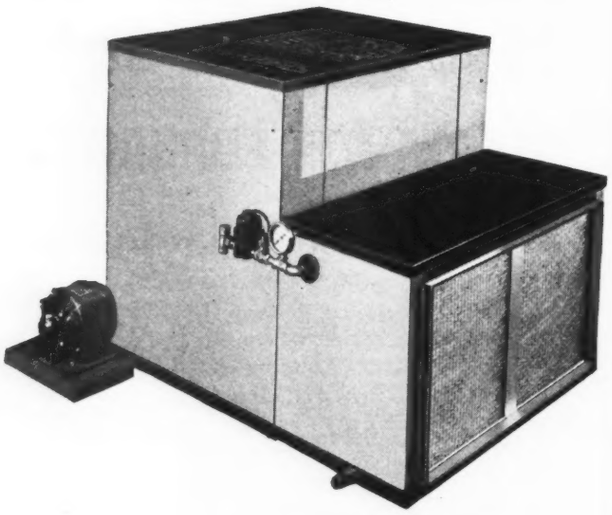
BALMI



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Please send information on your BALMI-AIRE Conditioner and other air conditioning equipment.

Name .....

Address .....

City ..... State .....

Test House

(*Continued from page 27*)

The arrangement shown in Fig. 5 (hookup C) was suggested by the manufacturer of the controls.

During the February 22nd test with outside temperatures just above freezing, the thermostat was adjusted with the blades set two degrees apart and the stack limit switch set to limit stack temperatures to 500 degrees. The fan continued to run for some time after the thermostat closed the dampers before the thermostat shut off the fan. After the fan was shut down plenum chamber temperatures increased from 295 to 325 degrees, not a dangerous temperature, and then decreased. The thermostat was set to close the dampers at 73 degrees and shut off the fan at 75 degrees. The room temperature increased to 77 degrees. The fan switch was operating "off" at 150 and "on" at 165 degrees.

With the fan switch set to start the fan at 165 degrees and stop it at 150 degrees air was delivered to Room 201 at an average temperature of 110 degrees with a low delivery temperature of slightly over 100 degrees at the point where the fan stopped. This room had the lowest delivery temperature. A lower temperature would have felt cool to an occupant near the air discharge. The idea seems prevalent in the warm air heating industry that when the fan starts the air delivery at the register faces should be at the temperature for which the job was designed. This is erroneous. This temperature is calculated for extreme conditions which seldom occur. The real function of the fan switch is to prevent the fan from delivering air that would be uncomfortably cool to the occupants *but the setting must be selected for the room having the greatest temperature drop.*

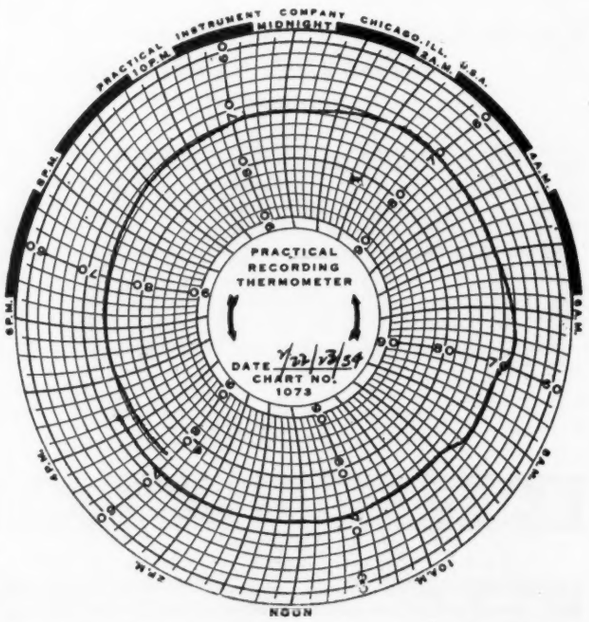

Fig. 2—A twenty-four hour recording chart of room temperatures under hookup (C), shown in Fig. 5. The results are excellent according to observers.

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This valve goes right on the cover of the water pan, as shown in the illustration. Its moving parts can't corrode or stick because they're always clear of the water. Easy to install in half an hour even if the furnace is going. Just drill three holes in the water-pan cover to mount the float valve. One hole in a convenient pipe line to mount the strap valve. Both valves are connected by ¼-inch copper tubing, 10 feet of which are furnished with each unit. The whole thing comes to you in a neat box . . . complete with directions.

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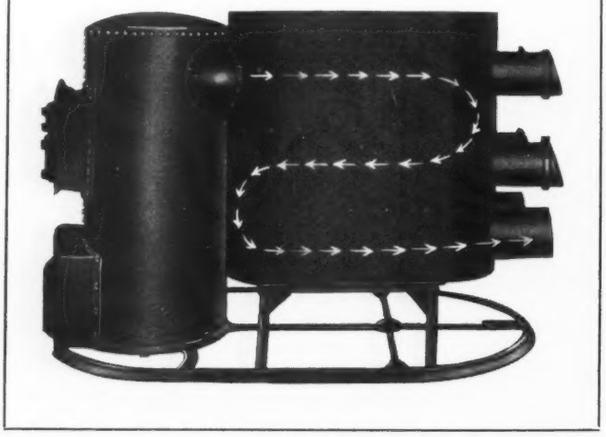

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THE MELLOW-AIRE, specially designed for oil burning and air conditioning, is one more—and a *potent* —reason for tying up to the Liberty line of warm air furnaces.

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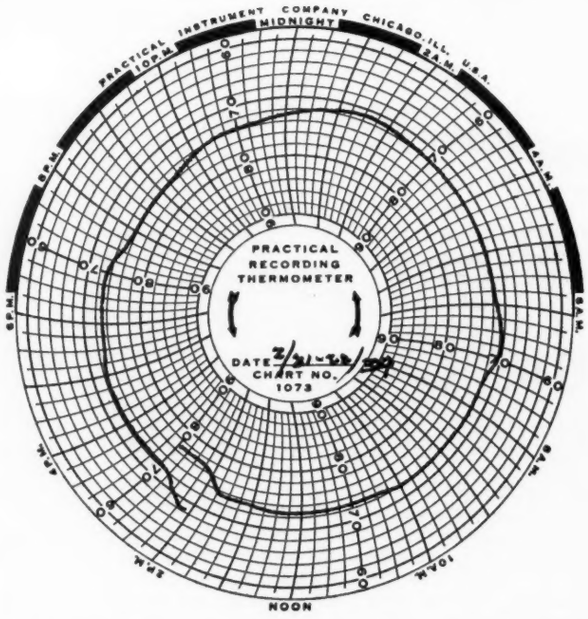

A twenty-four hour recording chart of room temperatures in room 201 under hookup (A) without a limit control in the damper circuit. Temperature variation was most pronounced of the three hookups, the chart showing a variation of four degrees and long periods of over-run.

Fig. 2 is a 24-hour record of the temperature in room 102 with the arrangement as shown in Fig. 5. Fig. 1 is a 24-hour record of temperature taken in room 201 with the control hook-up shown in Fig. 3. The three 24-hour records as shown are not true indications of the extent of temperature control. Firing periods, too often or not often enough will affect these records as will open doors and windows. Fig. 6 appears a good record, but it was taken on Sunday while the flat was not occupied.

Findings

During the control tests numerous visitors observed the progress and advanced many suggestions and ideas. Their comment varied greatly. For the purpose of showing just how diversified were the impressions gained, the impressions of three observers are given here. These three observers are—the writer, J. D. Wilder, Editor of AMERICAN ARTISAN and L. O. Grauer, field engineer for Detroit Lubricator Co., whose equipment was used on this test house.

Platte Overton

The writer fails to find anything to recommend in the dual control of the fire and operation of the fan by the thermostat unless the variation in room temperature is from 2 to 4 degrees and a dependable fire control is possible. Over-ride in room temperature is not the "bugaboo" it is maintained to be. Two or 3 degrees over-ride of room temperature is preferable to an over heated furnace and furnace room. Some means of closing the drafts before the thermostat is satisfied must be used. The instrument should be flexible enough that it can be set for a variation of draft, various types of fuel, and variation in weather. The at-

tempt to control room temperature by the fan is wrong. The longer the operation of the fan, the better the conditions in the rooms supplied. The room temperature should be maintained by the control of the combustion rate. The stack limit switch performs this function on the test job as outlined, however, this test house may be unusual enough to warrant many more tests on various types of houses.

As stated, the control of room temperature by operation of the fan seems wrong. When the fire is under control to the extent that room temperatures will vary little more than 1 degree, why attempt to cut down the fan performance? The fan eliminates danger of stratification and keeps up a circulation. As the "ideal condition" is a constant service of the fan and the future ideal system may be just ahead, the goal is an accurate control of combustion rate with as little variation in bonnet temperature as possible.

J. D. Wilder

The interesting features of the results indicated by these three control systems may be itemized as follows:

1—Every installation requires lengthy planning and observation to choose the best control system and set the instruments for maximum satisfaction.

2—The size of the structure is important. In this house serious over-run of room temperature was difficult; probably due to the large cubic content which assimilated excess air and temperature without registering on the thermostat.

3—Tests of air temperature at registers are necessary. Temperature drop in this house was higher than planned.

4—Gravity flow of air is difficult to anticipate. It is possible for gravity action to upset designed operation as, for example, the thermostat room may be "cold" when the fan is off or it may have so much gravity flow that the thermostat seldom calls for heat.

5—Setting the instruments can be accomplished only by test. The fan control must be set according to actual air temperatures at registers. The limit control can be set only by test on register air temperatures during both mild and severe weather as every combination of furnace, casing and fan effects the rapidity with which the furnace gives off heat, how much time the furnace requires to bring up bonnet air temperatures, how wide a differential is required of the fan control to allow the furnace to keep up with the fan once it starts.

6—Roughly we may say that the smaller the house the more important is the need for close cooperation between room thermostat, fan and limit control. Small houses over-heat more readily than large houses. Therefore dual control may be more important in small houses than in large ones.

7—Every house has critical rooms or areas. These critical rooms may be the ones where we cannot place the thermostat and their exposure must be

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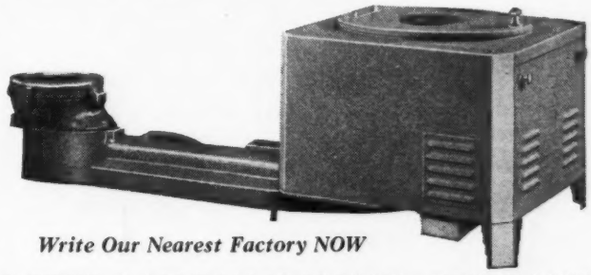

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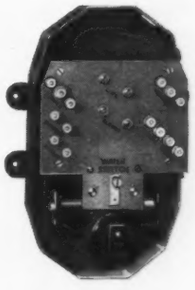

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compensated for by changes in the setting of the instruments.

8—We have given too much publicity to "comfortable 70," "economical 70." We may find that the thermostat should be set higher than 70 and the owner may be hard to sell on the higher setting.

9—Every contractor should have sufficient instruments to actually test his jobs. Air temperatures cannot be read from the skin on the back of the hand. 300-degree thermometers are needed to record register and duct air temperatures. A 900-degree thermometer is needed to read bonnet and flue temperatures. An anemometer is needed to record velocities. A draft gage is needed to record fan air delivery, resistance, etc.

10—It is impossible to balance any system for equally good operation during fan "on" and fan "off" cycles. Since we are specifying mechanical circulation we should sell the owner on letting the fan run longer. The greater the upset under gravity action the greater the need for longer cycles of fan operation for best results.

L. O. Grauer

In my opinion the results obtained on this job were unusually good. Close temperature control from one thermostat on a job of this size is unusual. Several factors are responsible. First and foremost the arrangement and design of supply and return ducts has a great deal of influence on uniform temperature. The designer of the system has done a good job and should be commended.

The fact that the house under test is protected by other buildings to a great extent and that during the test there was little wind and no bright sunshine undoubtedly contributed a great deal to the even temperatures obtained.

On a job of this size Zone Control is usually a necessity to obtain good temperature control. Exposure to prevailing winds and to bright sunshine makes even temperature control from one thermostat an impossibility. Supply pipes can be dampered but these factors vary.

There was extremely little carry-over of room temperature on this job even when the fan was controlled by plenum chamber temperature. However, carry-over usually occurs during mild weather and no tests were run in mild weather. A carry-over of 2 or 3 degrees is not serious but it has been the writer's observation and experience that carry-overs in mild weather of 6, 8 and 10 degrees are common. When this occurs the occupant is uncomfortable when the temperature falls to normal. For this reason thermostatic control of the fan is desirable for comfort. Overheating of the basement with this type of control does not necessarily follow. On the test job as shown above the furnace did not over-heat. This was due to the fact that the fan was not shut down until room temperature rose 2 degrees above the point where the dampers were closed.

The house and its installation might have been controlled by a system not tested wherein the dampers and fan shut down simultaneously. The fan control has a safety switch that turns on the fan regardless of the thermostat when the plenum chamber temperature rises. Such a hook-up with a stack limit control provides very satisfactory control and the wiring is somewhat simpler than the hook-up "C" used on this test job. With the limit control located in the plenum chamber results are not likely to be so satisfactory as there is a tendency to overheat and the safety switch operates the fan too frequently on some jobs.

Stratification is a bugaboo that is largely eliminated with a sensitive thermostat. A close operating thermostat will provide frequent fan operation and eliminate stratification at the same time providing even temperature control. Some variation above and below the thermostat operation will always occur, but the closer the thermostat operates the narrower will be the lag and carry-over.

Mr. Overton's comments on the limit control in the plenum chamber are entirely true. During long thermostat "on" periods bonnet location permits the fire to build up to a runaway condition. This causes a room temperature carry-over after the thermostat is satisfied. Where the fan is controlled by the thermostat there will be considerable gravity circulation or the safety switch, if one is used, will operate the fan frequently with a resultant temperature carry-over. I believe the function of the limit control should be to limit combustion and maintain the fire within reasonable limits. Where a fan is used and the control is located in the bonnet it does not do this. When the control is located in the stack it performs this function satisfactorily.

Heat lost up the flue may to some extent be regained by radiation to some rooms from the flue, but this results in overheating these rooms and is not under control so remains "lost" heat.

Carefully selected controls for the individual job and careful adjustments after they are installed are the essentials of satisfactory temperature control.

Conclusions

Preliminary conclusions indicate that selection and application of controls have not been given the consideration or study they require. The designer who plans a forced air system and merely specifies some one's XYZ "packaged unit" is courting trouble. They deserve the same measure of design and arrangement as the duct system or the conditioner. They should be chosen with discrimination and arranged to give the best possible results. Then go back to the job and watch them. Change them if necessary. With the right combination of instruments they may be changed to several arrangements. A few hours' observance for each hook-up is necessary. No two jobs may work alike. A few investigations as outlined above will assist the contractor to solve his present and future control problems.

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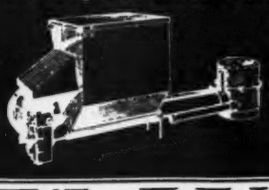
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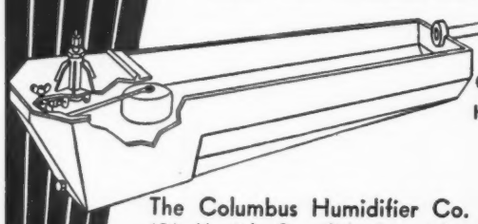

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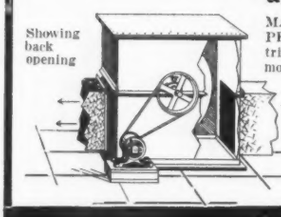

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(*Continued from page 24*)

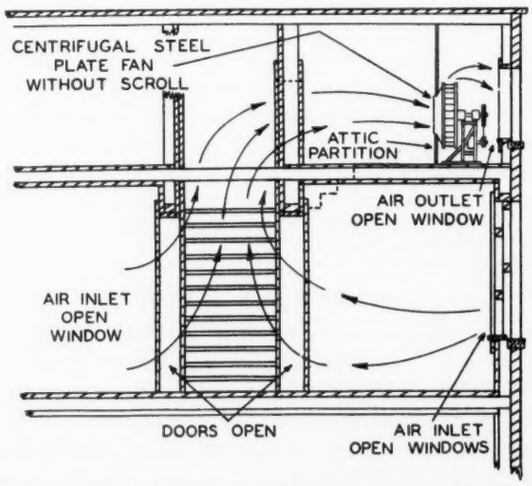


Fig. 3—Centrifugal curved blade steel plate fan installed without scroll

conditions obtaining when the fan was not used, as the curves show the indoor temperature to be at least 8 degrees higher than the outdoor at midnight, and additional temperature records show this difference to have been as high as twelve degrees on some occasions.

Anemometer readings taken at the ceiling grille showed an air velocity of about 330 f.p.m., corresponding to 1294 c.f.m. passing through this room. As the volume of the bedrooom was 2180 cubic feet, this rate of air flow provided about 36 changes of air per hour. With a total air flow of 2754 c.f.m. through the fan, the static pressure of the fan was 0.10 inch water. The efficiency of cooling at this rate of air change is shown quite effectively in Fig. 5. The indoor and outdoor temperature drop has been plotted at one hour intervals between the point at which the two temperature curves cross and the point at which the drop is a maximum; the latter being the point at which the actual temperatures reach their minimum value. These data were taken from Fig. 4 for the evening of June 27. It is

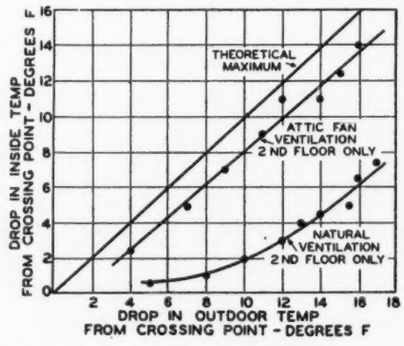
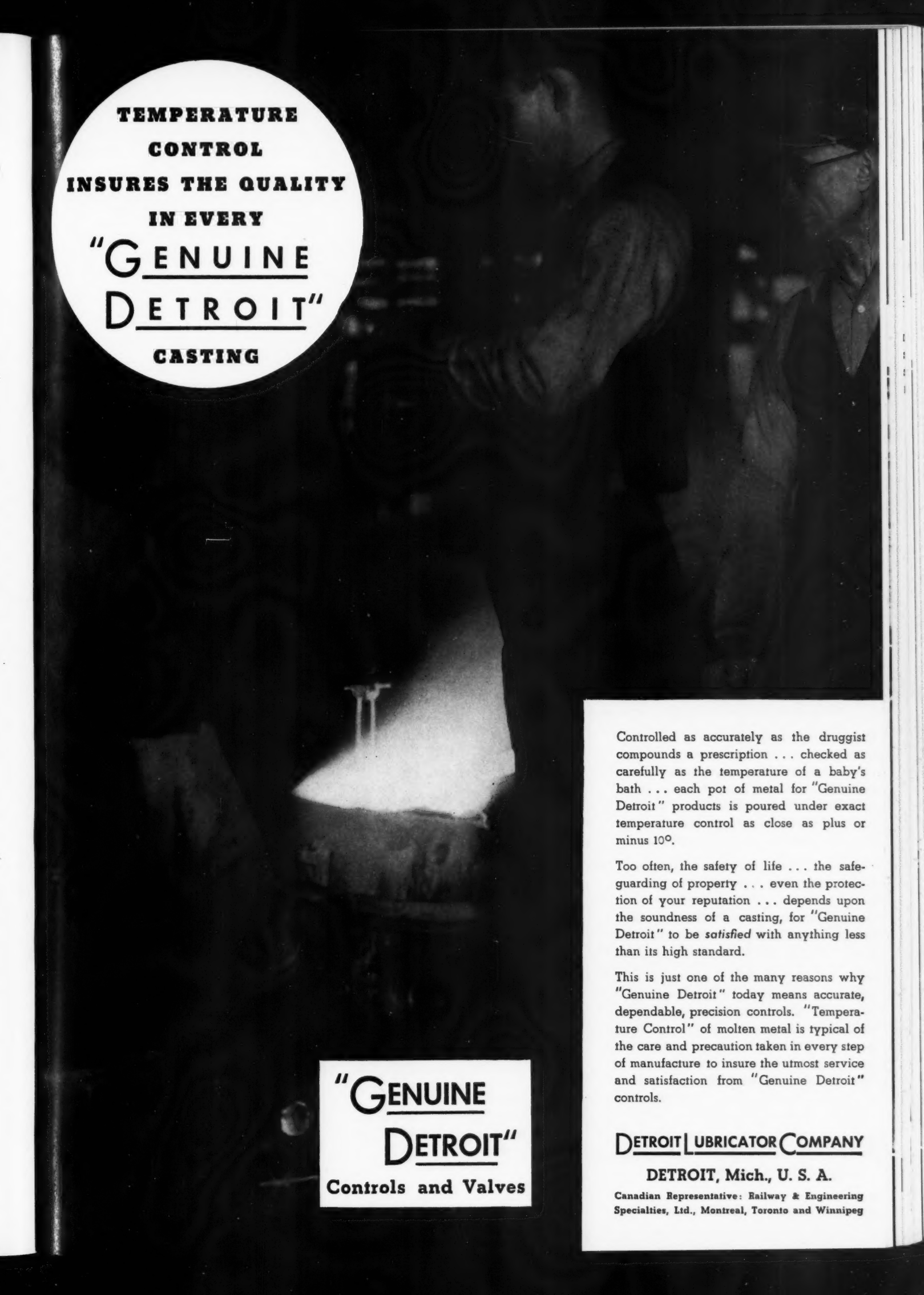


Fig. 5—Relation between inside and outside temperature drop following the point at which the temperatures coincide

evident that sufficient outdoor air was being drawn through the bed room to make the indoor temperature drop quite uniformly with the outdoor, with a differential between the two temperatures of two degrees.



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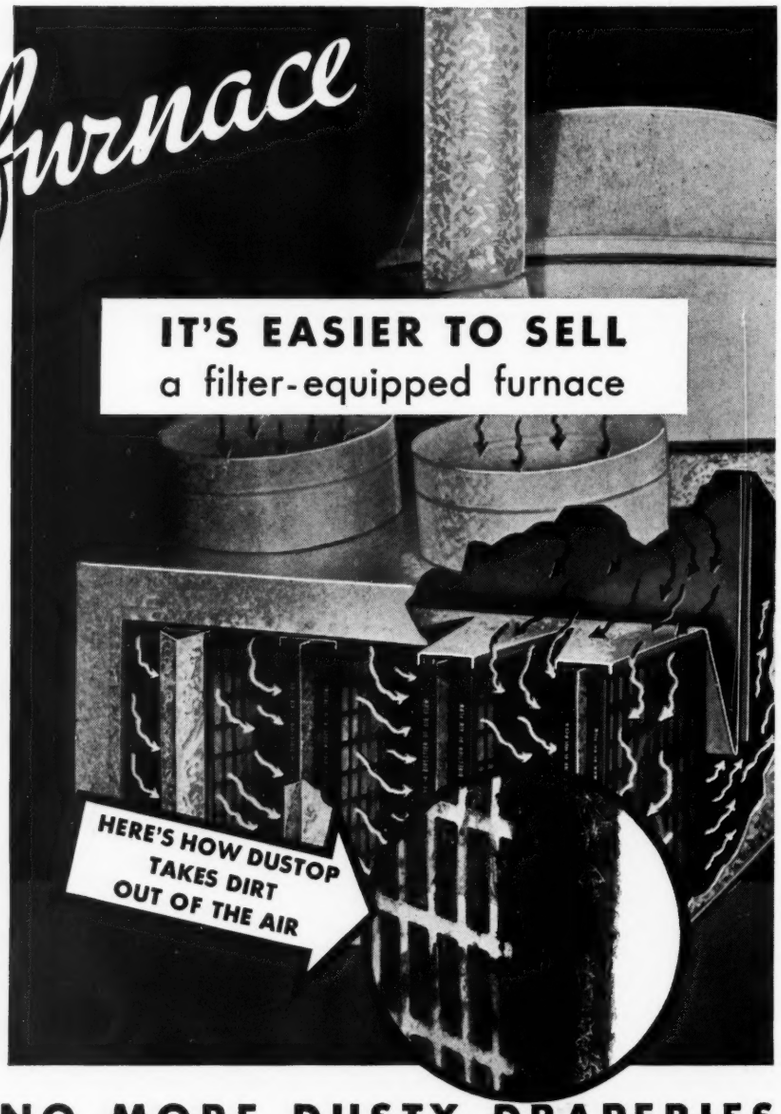

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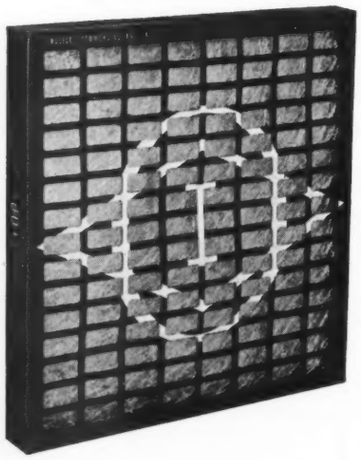

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● Clean, circulated heat in the home—that's exactly what you offer housewives everywhere when you sell warm air furnaces equipped with Dustop glass wool air filters. Tests and users' testimonials show that Dustop filters effectively remove dust, dirt, soot, pollen and other harmful particles from circulated air.

And Dustop-equipped furnaces are easier to sell! Besides the extra profit you make on each sale of filter equipment, you are lining up a substantial future replacement business. Consider Dustop's high efficiency and it's ease of servicing. Then order, sell and push Dustop. Cash in on this big profit opportunity. Write us for the full story. Owens-Illinois Glass Company, Industrial Materials Division, Toledo, Ohio. (Dustop is assembled and installed in Canada by General Steel Wares, Ltd., Toronto, Ontario.)

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DUSTOP AIR FILTERS

ASSOCIATION Activities

Oklahoma

A state meeting of sheet metal and roofing contractors was held in the Chamber of Commerce rooms in Oklahoma City March 24th and 25th, at which time new by-laws were adopted and the following permanent state officers elected:

H. Passmore, Oklahoma City—President.

B. F. Stephens, Tulsa—1st V. President.

T. Thompson, Tulsa—2nd V. President.

H. H. Hyer, Oklahoma City—Secy.-Treas.

Directors elected were: A. J. Arendell, McAlester; S. H. Lester, Oklahoma City; J. W. Tidwell, Tulsa; B. Howard, Ada; John Touelle, Enid.

State dues were set at $6.00 per annum. A code authority for the enforcement of the code in Oklahoma was elected as follows—H. Passmore, Oklahoma City; Chas. Grey, J. C. Leyster and A. F. Wilson, Oklahoma City; J. W. Tidwell, W. O. Moran and B. F. Stephens, Tulsa; A. J. Arndale, McAlester; Pat Branden, Ada; T. L. Conner, Ponca City; Ed DeHart, Chickasha; John Tooley, Enid.

Bad weather cut down the expected attendance, but the meeting was enthusiastic, the speakers were well received and every one is anxious to get the sheet metal and roofing code in operation.

H. H. Hyer,
Secretary.

▼ ▼

Utica, N. Y.

Five standing committees and a board of directors for the Utica Sheet Metal Contractors and Roofers Association have been selected.

Board of directors: Adolph Hesse, chairman; Stephen Weiss, Frank Penner, Henry Steinhorst, Robert Jepson, John Ryan, Joseph Slattery.

Grievance: Mr. Hesse, chairman; Mr. Steinhorst, Joseph Lindacher.

Membership: Mr. Lindacher, chairman; Griffiths Williams, Frank Bockardt.

Roofing: Mr. Weiss, chairman, and Mr. Jepson.

Sick: Mr. Bockardt, chairman, Edward Buger, Mr. Slattery.

Publicity: Mr. Penner and Mr. Hesse.

Beaver Valley, Penna.

The local organization was very proud to have its fellow member, Max Lieberman, elected President of the National organization. We all feel that Mr. Lieberman's natural ability as a leader will be of great benefit to the national body. The local organization extended its most hearty congratulations in a motion presented by Mr. George Zeller.

Special instruction classes are being held at the conclusion of each business meeting, all of the members being enrolled. Heating Engineering, Sheet Metal Fabricating, and Roofing are the three main subjects being covered in these classes. An unusual response has been the result of the special committee's endeavor to bring to the members of our organization an advanced treatment of these three main branches of the industry. The members enrolled are contributing freely of their own "pet" ideas, with the hope that the organization, as a body, will benefit. In turn, the organization is carefully "sifting" these theories, retaining the sound ones, and discarding the others.

A remarkable display of unselfishness has been shown by the members in bringing to light their thoughts. In the past, the general trend among the members of the industry, especially among the small shop owners and contractors, has been to keep to themselves any ideas which would be of benefit. "Let the other guy find out for himself" was the way they put it.

I'm very glad to say, as an observer, that this selfish attitude is fast fading among the members of the Beaver Valley organization. They are taking the stand that, only as their organization advances, will they progress. There are fewer masked countenances among the boys at the meetings. The old, narrow thought of "I'll keep my mouth closed so that they won't find out anything about me or my business" is fast giving way to the new, clear, unselfish attitude of "I'll tell them my trouble, and maybe they can help me." The Beaver Valley group is really advancing in theory, fact, and practice.

Charles J. Frye,
Secretary.

Waterloo, Iowa

The regular meeting of the Sheet Metal and Furnace Dealers' Association of Waterloo was held March 7 with all members excepting three present. The meeting was enthusiastic and the association is patiently waiting for the National Code to be signed by President Roosevelt.

Members of the association are optimistic over general business conditions and anticipate a considerable increase in volume and dollar sales during the coming spring and summer.

John G. Wright,
Secretary.

▼ ▼

Dayton, Ohio

Our group reorganized a year ago for the express purpose of furthering the President's recovery program in this locality. To that end, we have sent delegates to the first code meeting in Columbus, tendered our suggested code, signed the certificate of industry representation and corresponded with the National Association on pertinent matters.

For the present, we are operating under our own local code of ethics, which is designed to reduce unfair competition to a minimum. However, we realize the inadequacy of our little agreement, and particularly do we realize our lack of pressure to enforce it. Therefore we are impatiently awaiting the adoption of our National Code and the setting up of a local code authority.

We have been meeting regularly on the first and third Thursdays of each month. The meetings are informal, in the manner of smokers. The seating arrangement is circular so that each member can see every other member present. Talking face to face tends to reduce misunderstandings and for that reason our meetings are mostly friendly discussions and highly successful.

Plans for this spring include continuation of our code work, a banquet for the month of April and the annual election of officers for the coming year. We solicit letters from kindred organizations, and welcome any opportunity to exchange ideas.

R. E. Barrett,
Secretary.

Association Activities . . . .

Philadelphia

The Philadelphia Roofing, Metal and Heating Association held its monthly meeting March 1.

The budget committee made a report which was discussed and carried over until the next meeting. The selection of a central office for the Executive Secretary was left to the budget committee, to conform with the provisions of the code.

Questions were answered concerning the administration and meaning of the National Roofing and Sheet Metal Industries Code, and methods suggested to reach every shop in the trade as quickly as possible. Referred to the Code Committee.

The balance of the evening was spent in discussing the 1933 statements of approximately 30 shops, and explaining overhead charges in each shop by comparing them with several prior years and showing the reductions in the expense item as the gross business decreased. It was also explained how those shops who did not keep accurate books that balanced, who wished to conform with the code, could adopt an average overhead percentage on labor (productive) until such time as their business could be analyzed to find their true overhead expense.

The statements were thrown on the screen and item by item was selected and explained.

The meeting room was crowded and the interest shown was gratifying to the officers and committees. Suburban committees were in attendance.

Fred U. Ritter,
Executive Secretary.

▼ ▼

Tulsa, Okla.

The Sheet Metal Contractors Association of Tulsa met in regular session March 5th and elected the following officers for a six month period:

Carl H. Dean—President.
G. E. Looney—Vice President.
W. A. Conkling—Secy.-Treas.
Dorsey Harper—Sergeant-at-arms.

The members report an improved condition in business, some new jobs having been let and more work being figured at this time than there has been for a couple of years. Following our regular custom, the meeting place was changed to the shop of Dean & Day Sheet Metal Works, 1635 East 11th St.

W. A. Conkling,
Secretary.

▼ ▼

Milwaukee, Wis.

The monthly meeting of the Milwaukee Chapter of the Sheet Metal Contractors' Association was held March 7. Committees, appointed for 1934, are being organized and reports on committee activities are expected shortly.

New committees for 1934 were announced by President R. S. Schmieder as follows: Building Congress, Legislative and Code, Educational, Trade Relations and Policy.

Alfred C. Goethel of the newly established firm of A. C. Goethel Sheet Metal Works was accepted as a new member. The code committee was given correspondence and reports from various individuals in the industry covering the methods to be pursued in the application and operation of divisional and regional code authorities. The code committee will lay plans for complying with the latest suggestion and will report proper procedure for the setting up of such code authorities.

A new state law covering unemployment compensation insurance was discussed. This new law requires considerable revision of past methods of compliance and contractors will be given full information on the proper methods of procedure.

Paul L. Biersach,
Secretary.

▼ ▼

Kings County, N. Y.

On February 26th the Kings County Roofers & Sheet Metal Contractors Association held their regular monthly meeting in Brooklyn. Copies of the Construction Code were distributed. Edwin Scott spoke at length on this code and after his talk an open forum was conducted in which the sixty-five members present participated.

The various members who were present at the National Conference and the Heating and Ventilating Exposition expressed their enthusiasm at the meeting.

John Grady, Jr.,
Secretary.

▼ ▼

Reading, Penna.

The regular monthly meeting of the Sheet Metal and Roofers Association of Reading, Pa., was held March 7.

Charles F. Luppold, Secretary, made a report on his recent visit to the sessions of the National Association in New York City, and which was followed by a lengthy discussion by all present.

The membership committee reported visiting a great many of the non-member shops in Reading and beside securing three new members had the promise of many more.

A general discussion then followed during which many suggestions and plans were considered, whereby interest could be aroused and the work of our association be advanced. It was also decided to have a smoker for our next meeting and to secure a speaker who would be able to speak on our code and its advantages.

Charles F. Luppold,
Secretary.

▼ ▼

San Francisco Memorial

(*Continued from page* 14)

The soffit is a plain panel design all in kalamein. The entire soffit is wired for night illumination.

All fabricating operations for this large project were carried on in the Guilfoy shop. Because of the size of the contract and the similarity between large areas, many hundreds of sheets could be formed up ready for erection. Practically the only fitting work required was at valleys and around the moldings. Even the skylights, of which there was some 22,000 square feet, were so designed that practically all cutting and fitting was done in the shop.

In erecting the work, both roofs went along at about the same time. Crews were placed on both buildings and shifted as seemed most expedient from day to day. A work scaffold was erected across the coping and a hoisting derrick was then placed above at the level of the top of the steep section of the mansard. Materials were hoisted to the scaffold, then to the roof and distributed across the roof.

Fifty-two Underwriters' sliding fire doors and two large smoke vents (20 by 40 feet in area) were fabricated and supplied by the contractor.

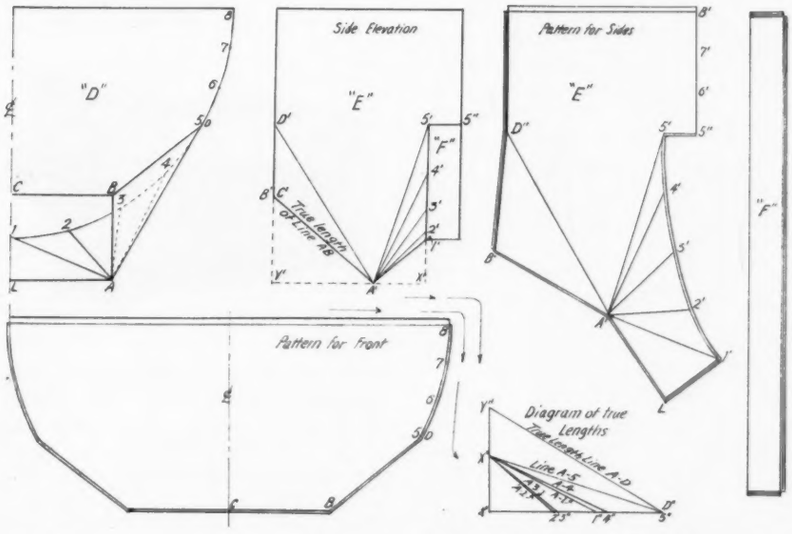
. . . the problem corner

Readers Suggestions On Past Problems

Hopper Pattern

American Artisan:

The attached drawing shows my suggested patterns for the hopper pattern published in the December issue of American Artisan.



We gave the reader's drawing to one of our students and he prepared the scale drawing shown. The reader may step this drawing up to full size. (Editor's note—Mr. Hart's drawing was one eighth inch scale which we cannot reproduce, but we will gladly mail the full sized sketch if our reader desires it.)

We have not given a full detailed description of the development of the patterns, however if the reader does not understand the sketches we shall be pleased to forward full information to him.

William Hart, Instructor,
Frank Wiggins Trade School.
Los Angeles, Calif.

◆ ◆ ◆

City Codes

In your March, 1934 issue, on page 21 you ask for information for H. H. P., Wisconsin, as to licensing ordinances for the Sheet Metal, Warm Air Heating & Roofing Industry, such as now are purposed by the N. R. A. Code.

I am proud to note you include Fort Wayne, for I believe we were the first in the U. S. to adopt the code as is now proposed. I refer to the latest addition of the national Code for W. A. Heating, and the Standard Practice in Sheet Metal as approved by the National Sheet Metal Contractors' Association.

We organized in 1924 with five members. After two years we secured the passage of a heating code, with a license fee of $25.00 per year, $1,000 bond, with permit fee of $2.00 for new or replaced furnaces, $1.00 for repair job, no provision for inspection. It was never enforced until after March 13th, 1928 when provisions were made for an inspector. Then it was not complete and on Jan. 13th, 1931 it was amended, and did not yet suit, and amended again on March 10, 1931, and now it fully satisfies the local conditions.

You will note it has been a long drawn out affair as we had to fight our way little by little, as no other city to which we could refer had any such thing. We were opposed by the cheap, cut throat contractor at every turn, but have almost completely whipped them.

Now the NRA code is in effect in every town, city, hamlet and rural districts, which is very similar to what we have, and no city should have any difficulty in securing its adoption as a whole.

If H. H. P. will send me 75c in stamps I will mail copies of our ordinance complete, 4 pamphlets.

Sheet Metal and Warm Air Heating Contractors' Association of Fort Wayne, Ind.

Chas. E. Tharp, Pres.,

American Artisan:

I would like to ask a question regarding your cooling problem in the March Artisan. On page 40 you say —heat absorbed per hour equals area of outside surface in square feet times coefficient times temperature difference. The average temperature difference is 10 degrees and the coefficient is 5.0. The area of the coil then becomes 21,324 = area × 5.0 × 10. I can't quite figure where you get the 21,324?

These are good subjects to run and I think the trade in general is waking up to the fact that they can't handle present day heating and cooling without making a study of the subject.

Reply By The Editors

The 21,324 used in the equation on page 40 of the March issue is derived as follows:

The data sheet shown with the article in the March issue gives a total heat gain in B.t.u. per hour of 17,059, which is the sensible heat load of the house. To this 17,059 we add a dehumidification load of 25% of the sensible heat or 4,265 B.t.u. per hour, making a total of 21,324 B.t.u. per hour.

This entire calculation is based upon observations charted at the Research Residence in Urbana and shown in Fig. 3 of our April, 1933 issue on page 35. This chart (Fig. 3) shows that the water vapor entering with the air of infiltration plus the water vapor exhaled by the occupants of the house accounted for 20% of the entire cooling load and, as in many engineering calculations designed to cover the entire country rather than one restricted area, we assume a 25% addition.

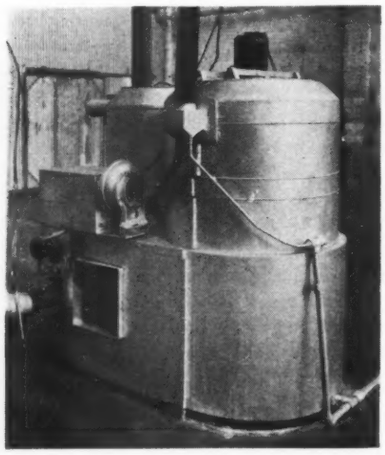
If this does not entirely clear up the matter do not hesitate to write us further.

New PRODUCTS

New Furnace

A new air conditioning furnace for twelve months' operation containing unique features of design, construction and operation is included in a booklet prepared by American Rolling Mill Co., Middletown, Ohio. Though this furnace is not an Armco development, Mr. J. R. Edwards and Mr. Urban C. Thies, the developers, have worked closely with the Armco organization and the furnace is the joint result of their efforts.

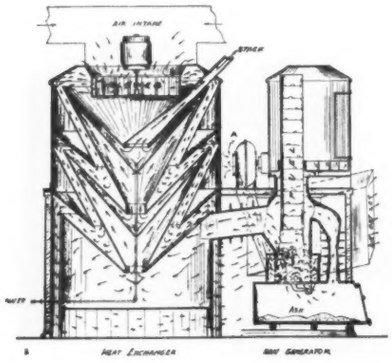
The unit is so different in construc-



tion that it is impossible to give full details here, but complete information may be obtained by writing the Armco Company for the pamphlet.

In brief, the furnace will burn coal or gas at efficiencies of 90 to 94 percent. Coal is burned as "coal sticks" consisting of fine coal wrapped in paper to form a stick 20-inches high, 6-inches in diameter and weighing 20 pounds.

The general appearance of the furnace is shown in the photographs, the cylinder having the fan motor mounted



above contains the heat exchanger. The other cylinder is a magazine with a revolving plate holding enough charges of the coal sticks to last 24 hours in zero weather. Sticks are automatically fed in until the magazine is empty.

The coal is burned under forced draft in a special retort just large enough to contain one stick. Air is introduced around the bottom of the stick through numerous holes and the fuel is consumed at temperatures ranging from 1200 to 2200 degrees depending upon the length of forced draft operation. Heat developed in the furnace is conducted to the base of the heat exchanger where the hot gases pass upward through a series of sloping steps and exits through the top of the exchanger. The blower forces air from the house down across the heat exchanger steps to the plenum at the base then through the rectangular housing around the fire pot and out the end or side close to the floor.

Many unusual claims are made for the efficiencies and operating characteristics of the new unit which seemingly reverses all natural processes of warm air heating.

The furnace can be used for cooling with cold tap or refrigerated water; also accomplishes humidification through the same sprays; provides positive forced air circulation; all by new methods.

◆

Oil Burner

Lewis L. Scott, President of Scott-Newcomb, Inc., of St. Louis announces an electrically ignited burner with a thermo safety, which burner will burn No. 4 and No. 5 oil and will retail at a low price plus a relatively small installation cost.

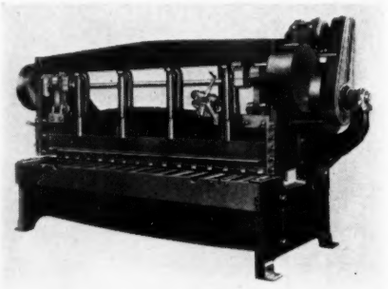
This low cost oil, has about 10,000 more B.T.U.'s per gallon than oils now commonly being used in domestic oil burners. This makes for an operation cost that competes with cheap soft coal.

To reduce trouble from clogging nozzles and clogging of screens this burner is a little over 110 times the area of a pressure burner nozzle burning the same quantity of fuel, and the fuel is used at 1 lb. pressure in place of 100 lbs., as commonly used with pressure burners.

Power Shear

Dreis & Krump Manufacturing Co., Chicago, Ill., announce a new Chicago Steel Power Shear with back gauge operated from the front of the machine. It is claimed that this location of the gauge marks an entirely new development in shears. The shear was perfected to meet a demand for high speed cutting with great accuracy.

It is stated that the operation of the back gauge from the front of the ma-



chine results in a considerable saving in time for the operator. The setting mechanism consists of an operating crank and dial which plainly shows the setting established or desired. The gauge automatically locks at any setting.

A one-piece hold-down is employed to eliminate any buckles in laying sheets. Individual hold-down fingers may be obtained if desired. The shear is all steel construction and designed in accordance with the usual Dreis & Krump standards.

◆

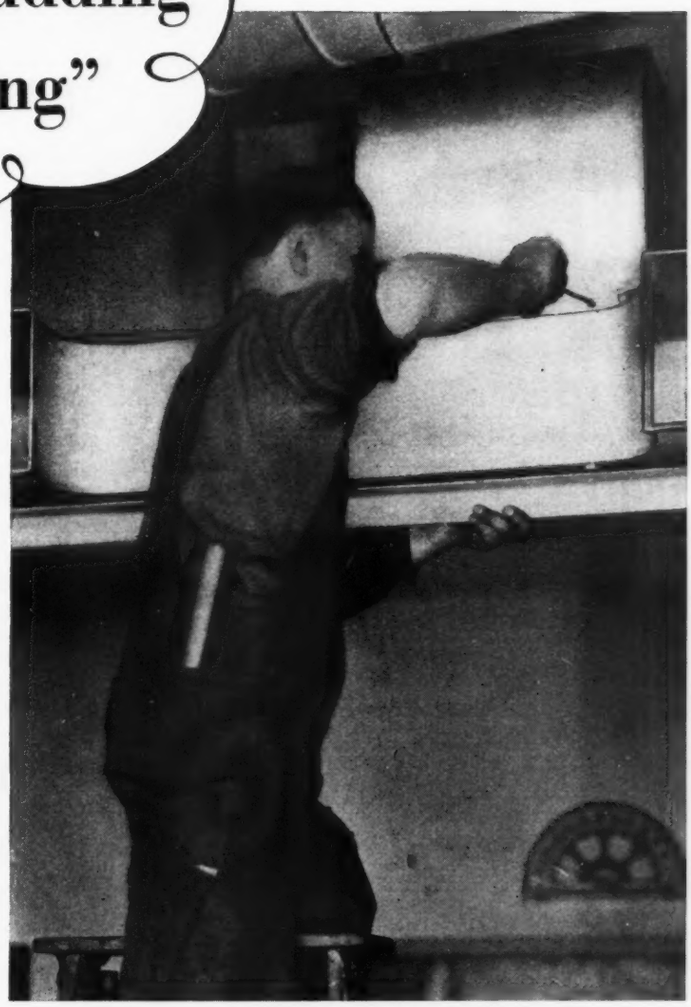
Air Conditioning Unit

The Thatcher Company, Newark, N. J., manufacturers of furnaces since 1850, announce the Thatcher Air Conditioner.

The conditioner consists of an upright housing containing a section of filters at the top with a multi-blade blower located in the bottom of the housing. The motor is located outside the housing and drives by V-belt. The housing consists of electrically welded sheets on an angle iron frame. The blower wheel is mounted on ball bearings which, in turn, are mounted in a cork-lined pillow block floated on rubber. This mounting is said to insure quiet, vibrationless operation.

The unit is designed for application to the Thatcher line of furnaces for coal and oil.

"Proof of the Pudding is in the Eating"



"Looks" are deceiving... *USE tells whether screws really cut sheet metal assembly costs*

Two cooks may turn out puddings which "look" equally delicious. It is only when you sample both that you find which pudding really is good. "Looks" don't count then.

Nor does appearance tell much about screws for assembling sheet metal. An imitation may "look" like a genuine Sheet Metal Screw, made only by Parker-Kalon. But, when you use them you learn which screw actually saves time and labor . . . which one only promises, but does not perform.

Genuine Sheet Metal Screws effect savings and make better fastenings, not because of their "looks" or hardened threads, but because of the way they are made and what they are made of. They *always* go in easily and quickly . . . *always* form a perfect, strong-holding thread . . . *always* draw up tight without breaking. It is because of such perfect action that Parker-Kalon Sheet Metal Screws are used by over 35,000 tinners, roofers and furnacemen.

How to Tell Genuine Sheet Metal Screws

★ MADE BY PARKER-KALON, originators of the Sheet Metal Screw and possessors of unique equipment, specially developed to make these Screws.

★ THEY HOLD . . . because the threads run full diameter right up to the head. ★ THEY GO IN EASILY . . . because the threads are (1) designed with an expert knowledge of the work they must perform (2) held to a high degree of accuracy and uniformity. ★ THREADS DON'T STRIP . . . HEADS DON'T TWIST OFF . . . because they are made from high grade steel wire of special analysis and are scientifically hardened by a process developed from 20 years' experience in the manufacture of Self-tapping Screws.

Sold only through Recognized Distributors.

PARKER-KALON CORP.
190 Varick St., New York, N. Y.

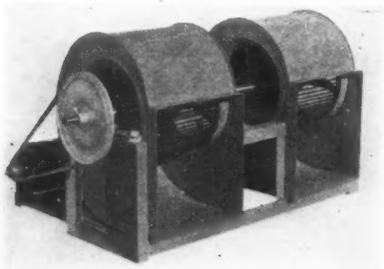
PARKER-KALON
HARDENED TYPE A SELF-TAPPING
Sheet Metal Screws

New Products . . . . . .

New Blowers

A new line of furnace blowers equipped with rubber mountings and designed to eliminate approximately 85 per cent of mechanical noises normally found in blower operations is announced by Lau Heating Service, Inc., Dayton, Ohio.

The new line comprises single and double wheel, multi-blade units with



motors mounted on an extension of the wheel frame. Motors may be mounted either on the side or behind the wheel providing several possibilities in housing.

Units will be furnished with any angle of discharge. A wide range of capacities is covered by the new series.

Full information on the new equipment has been compiled in the form of a booklet which may be obtained on request.

◆

Humidity Controls

A new line of room type relative humidity controllers is announced by the Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Built in various models providing for different electrical circuits and available with or without relative humidity indicators, this new line offers the accuracy and sensitivity needed for domestic or small commercial installations.

Actuated by a hygroscopic element composed of multiple groups of human hair, a simple lever mechanism transmits the motion of the expanding and contracting element to a mercury switch which, in turn, operates the humidifying or dehumidifying equipment. Ample electrical capacity is available for the direct control of line voltage solenoid water valves or small motors. With other circuit arrangements motorized valves may be controlled, or when using the Humidity Control as a pilot control of a magnetic starter, larger loads may be controlled, limited only by the load rating of the starter.

Although constructed for setting over a range of 20 to 80 per cent relative humidity, the setting pointer is internal and not subject to tampering by persons unfamiliar with humidity requirements. The covers enclosing the control mechanism are of the locking type requiring a special key to provide access.

Full information and literature can be obtained from the company.

◆

New Ventilator

In keeping with the rapid progress being made in the air conditioning field, a ventilator containing 14 points plus of ventilating superiority has just been placed upon the market by The Swartwout Company, Cleveland, Ohio.

The points claimed for this ventilator are—Rotary ventilator removes large volume of air per minute in all kinds of weather; bronze ball bearings never need oil or grease; oversize outlet opening permits easier outlet flow of air; outside adjustable louver dampers and operating mechanism provide complete regulation of ventilation; louvers open outward; vane of proper size keeps ventilator revolving in proper direction to wind; constructed of heavy gage iron; all joints double seamed; all interior members are structural shapes coated with rust resisting material; perfectly balanced by counterweight.

Make more money Install Vernois Furnaces!

1. One-piece cast radiator
2. Slip-on front
3. Extra deep ash pit
4. Duplex basket-type grate
5. Feed door—large, air tight
6. Fire pot—lock-cup joints
7. Reinforced combustion chamber
8. Vapor pan—large, easy filling
9. One-piece base ring
10. Hot blast combustion
11. Simplified assembly completely assembled and fitted at the factory

You have several months in which to get a line on prospective furnace jobs. There are house remodeling jobs in view—also new homes. That's the selling opportunity.

When you sell the Vernois Line you do these things—*in your own interest:*

You please your customer with a furnace that gives him *eleven* Points of Merit.

You insure fuel economy for your customer.

You make a boosting friend of each customer.

You save *plenty* of installation time for installers and helpers.

You meet today's demand for *quality* with "A Better Product."

Details gladly furnished; write for them today.

The VERNOIS "A Better Product"

MT. VERNON FURNACE & MANUFACTURING CO.

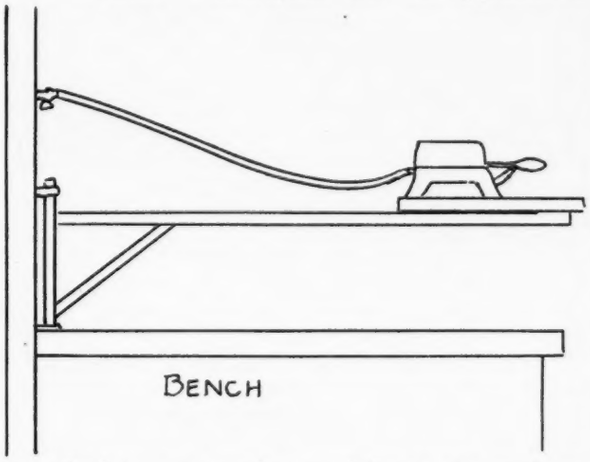
MT. VERNON, ILLINOIS

Kinks . . . .

Practical kinks on methods, special equipment, handy ways of doing things are invited. Kinks published will be paid for at the rate of $1.00 for an item without illustration and $2.00 for items with photographs or drawings.—The Editors.

Fire Pot Arm

THE fire pots in the shops of the Monrovia Sheet Metal Works, Monrovia, Calif., stand on the ends of long swivel arms fastened to the wall over the benches and elevated about 10 inches above the bench tops. The scheme facilitates work at the bench, inasmuch as by swinging the arm in an arc with a radius of about four feet, the appliance is



brought into a convenient position to the work on the bench. Since the arm is elevated above the bench top, it does not interfere with material and work which may be laid out beneath it. When not in use, the arm and its heater are shunted out of the way against the wall.

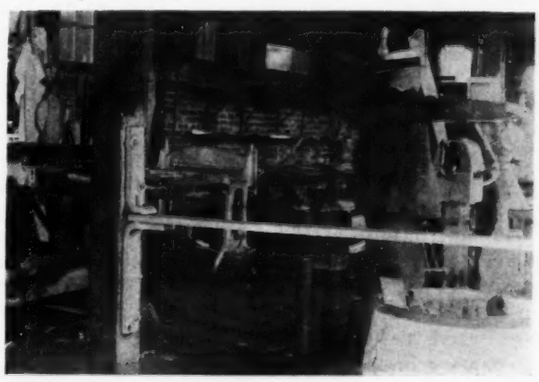
Willis Parker,
California.

◆

Seaming Anvil

A long section of heavy steel bar, with one end secured by a bolt in a bracket like that shown here and the opposite end supported by a light wire cable from the ceiling, makes a convenient seaming anvil for sheet metal work. It can be removed when not in use.

A Mechanic.



MORE BUSINESS?

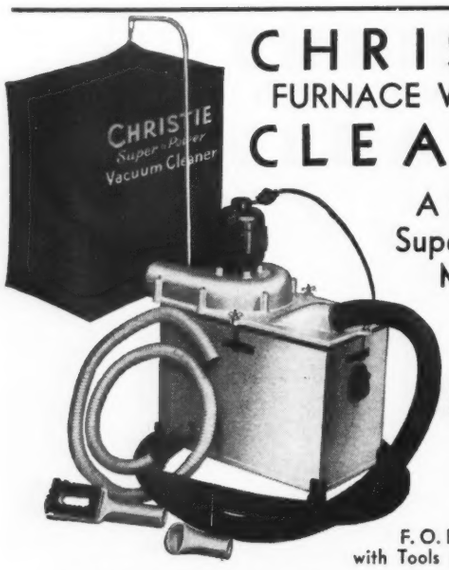
ARMCO Can Help You Get It...

YOU use two very important tools in your business—working tools and sales tools. • It is here that ARMCO can step into your picture and help you earn more money. • First, by supplying you with Armco INGOT IRON, known everywhere as the lowest-cost, rust-resisting sheet metal. And sheet metal that saves you money in the shop. It is soft, uniform, and free-working. • Then, there are the valuable dealer services—INGOT IRON SHOP NEWS; regularly issued mailing pieces; folders, stickers, blotters, and all the rest. Important, too, is the consistent advertising to industrial plants and the general public, to build greater prestige for the INGOT IRON construction you sell and install. It's worth money to you to ask your ARMCO Distributor salesman about this whole plan. Talk it over next time he calls. • Or, if you prefer, write direct to the address below.

THE AMERICAN ROLLING MILL COMPANY
Executive Offices: Middletown, Ohio

ARMCO

THE SHOP-SAVING IRON THAT SELLS EASIER



CHRISTIE
FURNACE VACUUM
CLEANER

A One-Man
Super Powered
Machine

$99.50

Subject to
Change Without
Notice

F. O. B. Cincinnati
with Tools and Attachments.

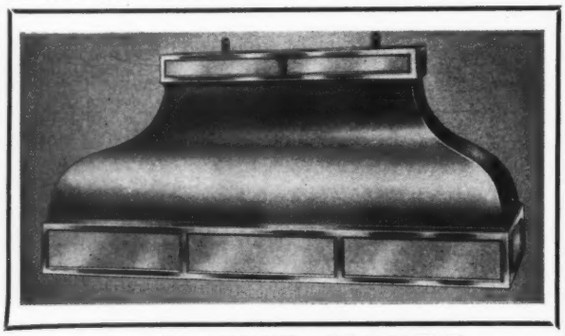
This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

CHRISTIE CLEANER COMPANY
Division of The Cincinnati Sheet Metal & Roofing Co.
226-30 East Front St. Cincinnati, Ohio
Salesmen: A few choice territories still open.



for RANGE HOODS
of Every Type *Use*
APOLLO ChromZinc

Tarnish resisting sheets that are light, pliable and easily soldered

APOLLO ChromZinc makes a most beautiful hood. One of these installations in a restaurant will set up a source of lasting publicity and create much valuable business for other work on which APOLLO ChromZinc and APOLLO Satin ChromCopper can be used to splendid advantage.

Show a sample of this distinguished metal to your next prospective buyer of hoods, shelf covering or table tops. The sample will turn the trick.

WRITE TODAY

For your sample of APOLLO ChromZinc and APOLLO ChromCopper and the name of jobber from whose stock you can draw your needs on a moment's notice. See page 18, Annual Directory Number, for additional information.

APOLLO COMPANY
Box AA La Salle, Ill.

News Items . . . . . .

A. C. Willard, President of University of Illinois

At a meeting of the Board of Trustees on March 13th, Arthur Cutts Willard was unanimously selected as President of the University of Illinois and will take office July 1st. President Willard has been acting Dean of the School of Engineering for some time and as head of the Department of Heating and Ventilation he received world-wide recognition for his research work. He is an internationally known authority and an outstanding engineer, author, educator and research investigator.

President Willard was born in Washington, D. C. and after receiving his preparatory education in the public schools of the District of Columbia, he attended Massachusetts Institute of Technology and was graduated in 1904. He commenced his teaching career immediately in California and in 1906 became assistant Professor of Mechanical Engineering at George Washington University. From 1909 to 1913, he served the Government as Sanitary and Heating Engineer, in the office of the Chief Quartermaster of the Army.

Since 1913, President Willard has been a member of the Faculty of the University of Illinois, first as Assistant Professor of Heating and Ventilation, and then in charge of the Department of Mechanical Engineering.

President Willard is the seventh President of the University of Illinois. In 1928 he was President of the American Society of Heating & Ventilating Engineers. He is a member of the American Society of Mechanical Engineers and Sigma Xi, Tau Beta Pi, Phi Kappa Sigma, Pi Tau Sigma, Sigma Tau and Triangle.

In the American Society of Heating & Ventilating Engineers he has served on many of the Technical Committees, including the Guide Publication Committee, Committee on Ventilation Standards, Committee on Code of Minimum Requirements for the heating and ventilation of buildings, and a member of the Committee on Research and since 1931 has been Technical Adviser for Research.

In the field of research, President Willard is known throughout the world and his best known work has been in the field of Heat Transmission, Steam Flow, and Warm Air Heating.

◆

Farquahar Elects Officers

M. R. Denver was elected president of the Farquahar Furnace Company, Wilmington, Ohio, to succeed J. R. Clevinger, at the last annual meeting of the board of directors.

Other officers are E. J. Hiatt, vice president; F. H. Farquahar, treasurer; R. B. Montfort, secretary and general manager.

Directors of the company are Mr. Denver, Mr. Hiatt, Mr. Farquahar, Mr. Montfort and Judge Frank M. Clevinger.

◆

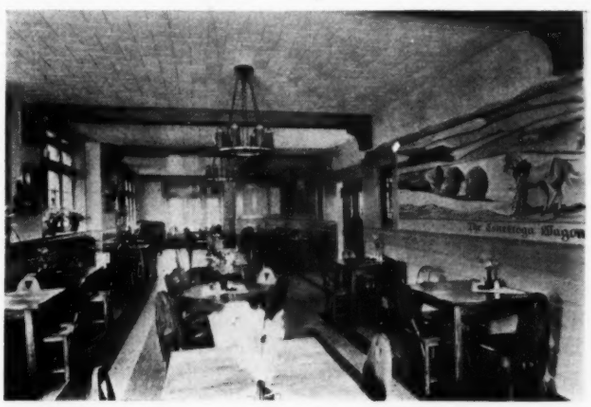
New Course in Blueprint Reading

Training in reading blueprints intelligently is offered in a new short course for correspondence study, announced by the Extension division of the University of Wisconsin at Madison. In three parts, the course offers help in understanding general blueprint reading and either civil and structural or mechanical engineering blueprints. No time is spent in explaining how the drawings should be made, except where the method of drawing is essential to an understanding of the print.

News Items . . . . . .

Air Conditioning for Bus Station

Air conditioning plays a prominent part in the success story of the Lancaster Bus Depot, which has made its restaurant one of the most popular eating places in the Lancaster section of Pennsylvania. The whole station is finished in early Pennsylvania Dutch fashion, with murals of early scenes on the walls. Linoleum and tiles scrupulously clean and with the air cool and wholesome, the dining room receives a large patronage from the surrounding section. Adjoining is a lunch room for quick service, which daily serves approximately 1,000 bus passengers.



The dining room is equipped with Frigidaire air conditioning, including a 10-ton compressor, connected to a heavy duty unit in the vestibule and three vertical floor type units.

◆

Ryerson Advances Men

Harvey Dieterich, Manager of the Structural Department of Joseph T. Ryerson & Son, Inc., has been made Assistant Vice-President in charge of the operations of the Structural and Special Order Departments in Chicago.

Mr. Dieterich has been with the company for 30 years and is one of the most experienced and widely known men in the structural field.

Ainslie Y. Sawyer has been appointed Assistant General Manager of Sales to specialize on the field promotion of Ryerson products. He has been with the Ryerson Company for 25 years.

Mr. Sawyer has served in almost every division of the Sales Department from Manager of the Export Materials Department to Manager, Cold Finished Steel Division.

◆

Robert Hohler Killed

Robert Paul Hohler, Sandusky, Ohio, one of the best known boys of his age to the sheet metal and furnace salesmen of Ohio was struck by an auto and instantly killed recently.

Robert is the son of Franklin D. Hohler, President and General Manager of the Hohler Furnace & Sheet Metal Co., formerly known as the John Mertz Mfg. Co. with which Mr. Hohler has been connected for 18 years.

◆

Goodwin With Perfection Stove

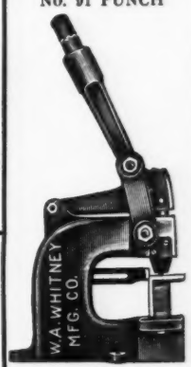
Ed. B. Goodwin, for the last several months connected with the Geo. Evans Corp., Moline, Ill., in their furnace department, has joined the sales force of Perfection Stove Co., Cleveland, Ohio, air conditioning division, and will cover the territory in the middle west.

WHITNEY LEVER PUNCHES

No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅛" to ⅜" by 64ths.

No. 91 PUNCH

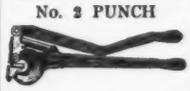


Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5-inches. Weight — 82 lbs.

No. 1 PUNCH

Length — 34 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅜ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅜-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to ⅜" by 32nds.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.

636 RACE ST. ROCKFORD, ILL

Erdle Perforating Co. Factory at Rochester, N. Y.

PERFORATED SHEET METALS

ALUMINUM, Brass, Bronze, Copper, Steel, Zinc, Tin, Monel, etc. For Ventilators, Grills, Filters, Drainers, Screens, Strainers, Grain Sizing and Grading, Machine and Belt Guards, Conveyor Lining, Galvanizing Baskets, Drying Machinery and Coffee Roasters. Our 50 years' experience is your assurance of satisfaction. Send us your inquiries and let us quote on your requirements!

ERDLE PERFORATING CO., Rochester, N. Y.

ERDLE

NOT A CHECKERBOARD

but

THE *Unpainted Roofs*
IN YOUR COMMUNITY

IN every community, there are any number of sheet metal roofs which must be painted at regular intervals in order that they adequately protect the buildings they cover. This is profitable business that sheet metal men frequently fail to take advantage of.

The way to most profitably work this business is with Thompson's "370 SPECIAL RED." This paint is outstanding because it has passed every quality test. Pure Red Lead, the best rust preventative known for metal, genuine imported Spanish Sesqui-Oxide of iron, highest grade Raw and Boiled Linseed Oil, just enough drying oils to give the proper set up—all go to make up a paint for sheet metal roofs that never gives cause for come-back or complaint.

Other Thompson Products are Alumbrite, the new Aluminum Paint for Wood and Steel and Lin-o-Jap, the Perfect Reducing Oil for all Paint.

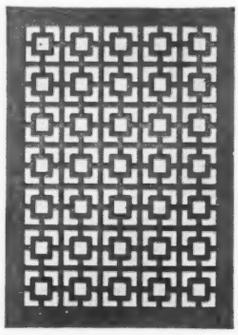
THOMPSON & COMPANY
P. O. Box 557, N. S. PITTSBURGH, PA.

PERFORATED METALS

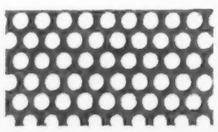
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.

Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7". Slot holes from .008" to 3" wide. Square holes of standard sizes. Complete line of brass and tin in small sizes. Prompt Service—Pleasing Prices.



Send us your next specifications.



(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

News Items . . . . . .

Servel Distributors

As distributor for its full line of commercial refrigerating equipment, milk coolers, and air-conditioning equipment in Vermont territory, Servel Sales, Inc., has announced the appointment of S. R. Carter, 6 Chase Land, Burlington, Vermont.

The Ballou, Johnson and Nichols Company, wholesale organization, in Providence, R. I., has been appointed recently as distributor for the complete line of commercial refrigeration and air-conditioning equipment.

Distribution through the new company will cover all of Rhode Island, eastern Connecticut and southern Massachusetts. The company will sell retail in the local headquarters and through appointed dealers in the area.

◆

Hays Representatives

The Hays Corporation, Michigan City, Ind., announces the appointment of the following new representatives for territories indicated: Kansas and Western Missouri—T. C. Messplay, 2219 East 69th Terrace, Kansas City, Mo.; Washington—Fairman B. Lee, 114 Railroad Avenue South, Seattle, Washington; Eastern Tennessee—Leinart Engineering Co., 427 Walnut St., Knoxville, Tenn.; Western Michigan—Engineering Sales Co., Meyer Building, Holland, Mich.

◆

January Stoker Sales

The Department of Commerce, Bureau of the Census, report of stoker sales for January, 1934, shows that 83 identical manufacturers are now reporting their monthly sales to the Bureau. Sales for January totaled 799 units as compared to only 424 in January, 1933, and 450 for the same month in 1932. Of the 799 stokers sold in January this year, 512 were in Class 1 (residential size—capacity less than 100 lbs. of coal per hour.) Detailed sales figures are shown in the following tabulation:

Class No.	January 1933	January 1932	January 1934
1	288	275	512
2	30	37	84
3	38	23	80
4	68	115	123
TOTAL	424	450	799

The Bureau has made a revision of sales for all months of 1933 inasmuch as 83 manufacturers' statistics were reported and readjustment made of the tabulation to include the additional establishments reporting. It should be remembered that even with 83 establishments now reporting, this is but a partial list of stoker manufacturers. The best information obtainable indicates that over 175 firms in all parts of the country are engaged in the manufacture and sale of mechanical coal-burning stokers.

◆

Revere Appointments

Revere Copper and Brass Incorporated, has announced the appointments of R. H. Binns, Jr. and S. H. Wilson, as Assistant General Sales Managers, with headquarters in the General Sales Department, New York Central Building, New York City.

Mr. Binns will devote his time principally to Merchandise Sale which, in general, includes those products sold through distributors for resale. Mr. Wilson will specialize on sales to industrial consumers.

News Items . . . . . .

Real Property Inventory

Every phase of the building materials industry of the United States should obtain useful information through the result of a government project now nearing its final phase—the Real Property Inventory, a house-to-house canvass of residential structures in 63 cities conducted by over 5,000 workers taken from the ranks of the white collar unemployed.

The enumerators who have been working on this inventory have gathered data on the physical condition of every residential structure visited in the 63 cities and their records will show the type of buildings and the materials of construction, its sanitary facilities, whether it has electricity or gas, the type of heating apparatus, whether constructed of wood, brick, stone, concrete, tile, stucco or other material, and other major details of its construction.

There are two phases to this project, the physical property inventory and the financial study. The financial study, or second phase, is less extensive, nevertheless it will be a thorough study of certain sections of selected cities on rentals, mortgages, interest rates, delinquencies and other phases.

It is believed that this project will hasten recovery in the building industry by supplying and maintaining a source of hitherto uncollected or unassembled data.

◆

Death of Wm. H. Berger

Wm. H. Berger died at his home in Asheville, N. C., April 5, 1934, in his 93rd year.

Mr. Berger, until his death was President of Berger Bros. Company, Philadelphia, and the founder of that company in 1874, then known as Wm. Berger & Company. He has not been active, however, in the company for several years.

He was a veteran of the Civil War and the originator of a large number of articles made of malleable iron and used by the sheet metal working industry.

◆

Century of Progress Homes

The colony of modern homes at Chicago's World's Fair of 1934 will be bristling with new ideas and suggestions. Every house is to be completely redecorated. Some will be extensively remodeled. Others are to be removed, and in their place newer efforts and experiments will appear.

General Houses, Inc., developers of prefabricated steel panel dwellings, promises a number of novel displays besides the house itself. Among the new features will be a group of full-size model sections demonstrating the chief essentials of steel house construction and showing the progress that has been made in the utilization of the metal for home building.

One home is to be a model form house of 1950, with working quarters on the first floor and living quarters on the second. The first floor will include the kitchen and a shower room, milk room, tool and storage room.

The second house, called the "subsistence farm house," is to be a structure of four or five rooms built not to exceed the cost of $3,000.

◆

Premier Sales Gain

Writes R. M. Marberry, Premier Warm Air Heater Co.—"Premier's net paid sales for the first quarter—December, January and February—are 61.34% ahead of this same quarter last year.

SHEET METAL JOBS .....EXTRA PROFITS

You can let extra profits leak away through obsolete or awkward shop equipment and tools—or you can keep these profits in your pocket.

If you need dependable, quick-cutting, accurate shears, you're paying for the Viking Shear and might as well have it.

Let us furnish particulars.

VIKING SHEAR CO.
ERIE, PA

V I K I N G

Now Is the First Time in 5 Years That You Have Had A Chance to Make Real Money And Here's the Way to Do It

THERE are immediate profits for you in the fact that heating plants have been shamefully neglected for the last four or five years. In any residential section today, in any one block, you know you can find a dozen broken down, dirty furnaces with clogged smoke pipes, chimneys, and air ducts. New plants, new parts, are needed in many places, but in *every* basement today there is a plant that needs cleaning. The first step in plant conditioning is cleaning.

Cleaning pays you at the time you do it, and more later in the friendly contact and good will it builds for you. You can sell cleaning jobs now, at a profit, and later sell repairs and new parts. In hundreds of places if you start by offering a cleaning service—low cost to owner—big benefits to owner—and a real profit for you.

But you must be ready with a profit-earning, job-doing furnace cleaner—a truly complete outfit. That means a Super Suction Cleaner.

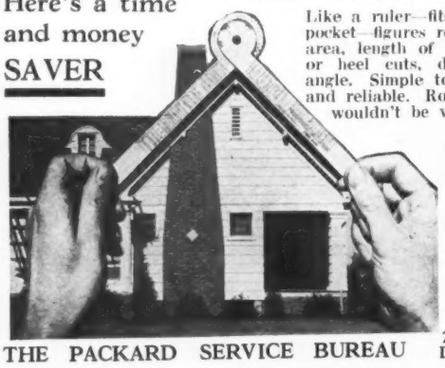
The Super is shipped to you today fully equipped with special extra tools for cleaning smoke pipes, air ducts, chimneys, (from the basement—not the roof) and at no increase in price. We also give you free the Plan Book which tells you how to get paid for good-will jobs. We will send you a Super for free trial—you keep what it earns during trial period. Why not get into business all over? Send for your Super now and get busy.

The National Super Service Company
1944 No. 13th St., Toledo, Ohio
Dealers—Salesmen—Write for our proposition

ROOFERS!
Here's a time and money SAVER

THE PACKARD ROOF PITCH INDICATOR

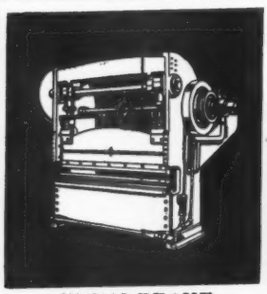
Like a ruler—fits in your vest pocket—figures roof pitch, roof area, length of rafters, plumb or heel cuts, degree of any angle. Simple to use. Correct and reliable. Roofers say they wouldn't be without it.

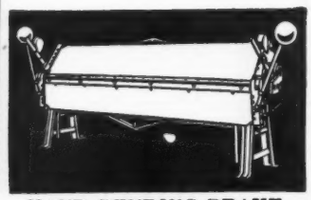


ORDER TODAY
$1.00 post paid anywhere in U. S.

THE PACKARD SERVICE BUREAU
2nd&ScottSts., Davenport, Ia.

CHICAGO





PRESS BRAKE HAND BENDING BRAKE

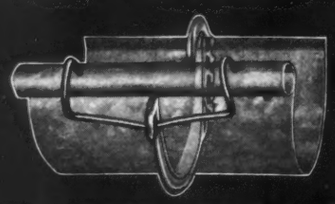
Steel Brakes—Presses—Shears

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

ALL ON ONE ORDER TO BRAUER
Any REPAIRS FOR STOVES BOILERS and FURNACES
A.G. BRAUER SUPPLY CO. SAINT LOUIS
ALL IN ONE SHIPMENT TO YOU

"BB" QUALITY

Order from your jobber



Saves time and labor

"BB" SPRING CIRCLE CLIP
Furnished only with "BB" Circles at no extra charge over old style straps.
BERGER BROTHERS CO.
229-237 Arch Street, Philadelphia, Pa.

New Literature . . . .

What Is Air Conditioning?

The Henry Furnace and Foundry Company has just printed an edition of a new booklet "Questions and Answers on What Is Air Conditioning."

The booklet has been written for the layman in an attempt to give him an explanation of the importance and desirability of home air conditioning.

The booklet is printed in the form of questions and answers and covers such subjects as—"Where does dust come from?" "How does dust affect health?" "How can dust be removed?" "What is humidified air?" "How does air conditioning relieve these conditions?" etc. Full answers to all of these common questions are given with illustrations.

The Henry Company will be pleased to send copies of this interesting booklet to contractors writing them.

◆

Ventilation Leaflet

"What About the Ventilation in Your Buildings" and "The Controls on Your Steam, Air and Water Lines" is a small, colorful folder giving a birdseye of the products and facilities which The Swartwout Company, 18511 Euclid Ave., Cleveland, Ohio are able to supply. Copies will be sent to anyone writing the company.

◆

Roofing Accessories Leaflets

David Levow, 308 West 20th St., New York, N. Y., has brought together in a series of leaflets the various items which he manufactures and jobs.

Copies of all this material may be obtained from the company.

◆

Insulating Leaflets

A series of three new leaflets covering various types of insulating materials is announced by Ehret Magnesia Manufacturing Company, Valley Forge, Pa.

One leaflet covers refractory cements and describes the various products made by the company for this purpose.

A second leaflet describes "Fibrekote" a water proofing protection for all thermal insulation such as roofs, tank tops and other exposed surfaces. The material can also be used for protecting boilers, heaters, tanks, pipe and duct work.

The third leaflet covers "Enduro," an insulating material furnished in several forms for insulating high temperature pipes, ovens, ducts, breechings and other surfaces subjected to high temperatures. The leaflet contains a full description of the material and suggested applications.

Copies of the leaflets may be obtained from the company.

◆

Lau Catalog

Lau Heating Service, Inc., Dayton, Ohio, announce the compilation of a new catalog showing the company's lines of blowers, conditioners, washers and fans.

The catalog is arranged with illustrations of the various units and complete descriptions of each product. Tables, sizes, capacities, and operating characteristics are also included for all products.

The catalog contains numerous suggestions on proper selection and application of the units to particular heating problems.

Copies of the catalog may be obtained from the Lau Company.

New Literature . . . .

1934 Edition of the A. S. H. V. E. Guide

The A. S. H. V. E. Guide for 1934 is off the press and ready for distribution. The Technical Data Section of this 12th Edition has been enlarged to include newly developed data that are vitally important to heating, ventilating and air conditioning practice. From the practical experience of members as well as from available research sources useful facts have been gathered and incorporated in the 42 chapters which have been arranged for convenient reference. An extensive index has been included to aid the reader.

All of the data in the previous edition have been reviewed, many chapters have been revised and amplified while others have been completely replaced. The new chapters include the Cooling Load and Cooling Methods, Unit Conditioners, Radiant and Electric Heating, Humidifying and Dehumidifying Equipment, Steam Heating Systems and Piping. Extensive changes were made in the chapters on Industrial Air Conditioning, Natural Ventilation, Central Fan Systems, Air Cleaning Equipment, Sound Control, Mechanical Furnace Systems. Slight modifications were made in the chapters on Heat Transmission and Air Filtration based on a careful check of the experimental work which produced the basic figures.

◆

Making Steel

The Inland Steel Company, Chicago, has just issued a new edition of their booklet "Making Steel." Previous editions have proved very popular and have had a wide distribution for school use. The booklet tells a complete story of the process of making steel, brought up to date as to methods. It is well illustrated and written in everyday, non-technical language so that it is easily grasped by children or adults unacquainted with steel industry parlance.

◆

Conservation Leaflets

Contractors may obtain from the Metropolitan Refining Co., Inc., 23 50th Avenue, Long Island City, N. Y., copies of three leaflets covering Sootracide, Vaporene and Aquaproof.

Sootracide is a product introduced on soot covered surfaces where it sets up chemical effects in the soot causing the soot to ignite at low temperatures and burn away.

Vaporene is a material designed to prevent and eliminate corrosion, pitting and congestion in water units of air conditioning equipment. The material is added to the water going to the equipment and causes suspended matter which clogs pipes and fittings to precipitate and pass through the system.

Aquaproof is a pure asphalt material applied to roofs, walls and other surfaces for water-proofing.

These products together with proper methods of application are presented in the leaflets.

◆

Machinery Leaflets

Ward Machinery Co., 564 West Washington Blvd., Chicago, Ill., will mail to contractors requesting copies two new price sheets—one covering the Chicago steel hand bending brake and the second the No. 28 foot press.

These leaflets are in the form of photostat pages and contain full information on sizes, dimensions, capacities, models and a complete tabulation of the prices for each part of the machines.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON INC

CHICAGO DETROIT MILWAUKEE ST LOUIS JERSEY CITY CINCINNATI BUFFALO CLEVELAND PHILADELPHIA BOSTON

SHEETS

"Talk About Profitable Repair Orders and Cleaning Profits with the TORNADO Furnace and Boiler Cleaner

"My TORNADO Furnace & Boiler Cleaner has brought me more profitable repair and replacement business than I have had in years in addition to hundreds of dollars profit on the cleaning. In our 35 years in business it is the most profitable investment we have ever made." So says the General Repair and Equipment Co., Elizabeth, N. J.

Hundreds of other TORNADO users are also cashing in on the splendid profits to be made with the TORNADO. You too can earn real money with the TORNADO. Send in at once for complete details and p so for the facts proving Breuer's TORNADO to be a superior cleaner with the most complete tools (chimney cleaner if desired)—No obligation—Write us TODAY for free trial offer.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

FREE SAMPLE RUBYFLUID PRODUCTS

☐ Acid Core Solder ☐
☐ Rosin Core Solder ☐
☐ Liquid Flux ☐
☐ Soldering Paste ☐

(*Use your letterhead in requesting*)

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HOTEL LENOX

Business Men—Tourists—World Travelers—
All come back to the Lenox. Famous for good food, homelike comforts, perfect service.

LOW RATES
Single, $1.50 to $3.00
Double, $2.50 to $5.00
Family Suites, $6.00 up

Send for Free AAA Map and Booklet

CLARENCE A. MINER, President
140 North St., near Delaware

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OLD TRADITIONS
of Superlative Living

AWAKE
again in the
Newly Modernized

AUDITORIUM HOTEL

The luxury, the comfort, and the elegance that our fathers loved are yours today in the famous Auditorium Hotel.

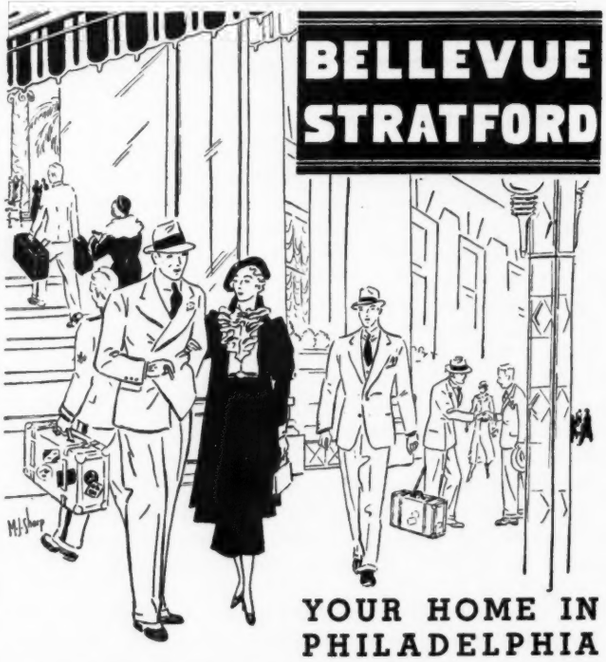
Here, in these halls and in these rooms where the great of a quarter century have trod, you can enjoy the distinction of yesterday and the modernity of tomorrow.

Unrivalled in location, facing the blue of Lake Michigan, rich in traditions, and eager to serve, the Auditorium offers large, luxurious rooms from $1.50 single without bath and rooms with bath from $3.00 single. Double from $5.00

Write for illustrated colored folder
ARTHUR J. NEWMAN, *Manager*

MICHIGAN AVENUE AT CONGRESS STREET

CHICAGO



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A hotel that lives up to its fine traditions . . . an unhurried hospitality reminiscent of an Older Philadelphia, and its charm . . . a cuisine that bespeaks the wizardry of world-famed chefs . . . plus every modern, thoughtful regard for your comfort, convenience and pleasure . . . all at most reasonable rates.

Claude H. Bennett, *General Manager*

Wanted---Bids
on schools, gymnasiums, public halls

Financial aid for public work by the Federal Government is making possible the completion of community projects requiring heating and ventilating.

You can be prepared to submit bids on this type of work at small expense by using the plan service of a consulting engineer. Preliminary plans or complete details prepared from architect's plans.

Special prices for all types of cooling and air conditioning installations.

48 hour service

Study these low prices—

PUBLIC HALLS, GYMNASIUMS

Up to and including 50,000 cu. ft. gross content.....$0.12 per 1,000 cu. ft.
50,000 cu. ft. and over.....$0.10 per cu. ft.

SCHOOLS

20,000 to 50,000 cu. ft.....$0.30 per 1,000 cu. ft.
50,000 to 70,000 cu. ft.....$0.25 per 1,000 cu. ft.
70,000 to 100,000 cu. ft.....$0.20 per 1,000 cu. ft.
100,000 cu. ft. and over.....$0.15 per 1,000 cu. ft.

Also steam, hot water, vapor systems at 1 cent per square foot of radiation. Combination systems at similarly low prices.

Write for complete information.

Platte Overton
5236 West Huron Street Chicago, Ill.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date.

SITUATIONS OPEN

OPPORTUNITY: A WELL KNOWN FURnace Company wants a sales engineer fully qualified in warm air heating and air conditioning to operate in a territory on a commission basis. Address Key 275, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED: MANUFACTURERS' AGENTS or Sales Engineers with forced air heating and air conditioning experience to handle a definite territory on commission basis on a line of equipment which is showing increased sales. Repeat orders indicating customer satisfaction. Give complete experiences and references in first letter. Address Key 273, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED: ESTABLISHED SALES ENgineers or manufacturers' agents with knowledge of forced air heating or air conditioning, who can handle definite territory on commission basis on a well engineered line of equipment which is showing a remarkable record of outstanding performance and giving real satisfaction to both customer and dealer. Only high grade men with engineering knowledge need apply. Furnish your engineering record and complete sales experience and references. Address Key 269, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

MANUFACTURERS' REPRESENTAtives: Territories open on well-established heating and air conditioning product in Omaha, Detroit, Indianapolis, Pittsburgh, Rochester, Chicago, Milwaukee and Minneapolis. State lines you now handle and territory covered in answering. Address Key 271, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE

FOR SALE: CHICAGO POWER ELBOW Machine and Bookkeeper's desk with high chair. Address Teela-Zentner, Oshkosh, Wisconsin.

FOR SALE: EXCLUSIVE SHEET METAL and furnace shop. Wisconsin town. Good location. Reasonable rent. Priced right. Address Key 274, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE

Newton Hickory Mallets

Designed for metal workers

Balanced and can be used without wrist strain

●

Cortland Hickory Handles

All sizes and weights

●

Send for complete price list

WARREN HANDLE WORKS

CORTLAND, OHIO

FOR SALE

SHEET METAL WORKING MACHINERY AND TOOLS

●

Rebuilt - Trade - In Machinery

●

Angle Iron Cutters	**Grinders**
Beading Machines	**Punches**
Bending Brakes	**Shears**
Bar Folders	**Turners**
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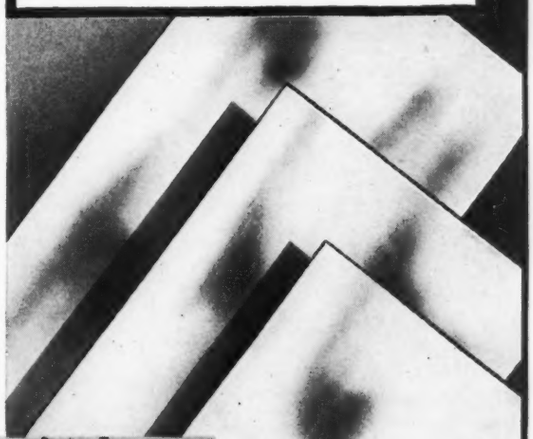

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